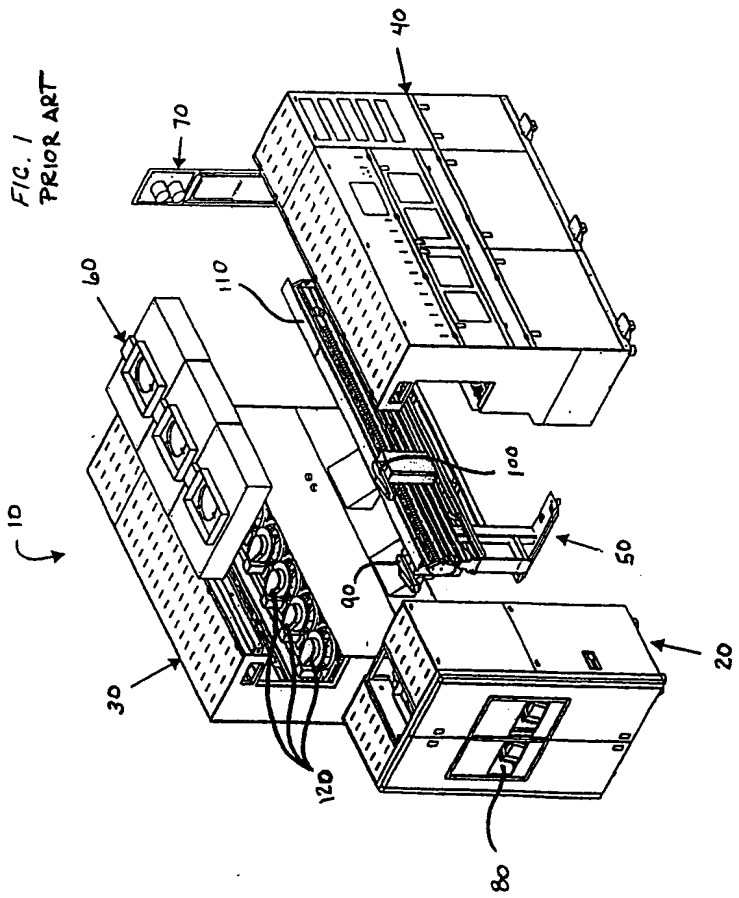
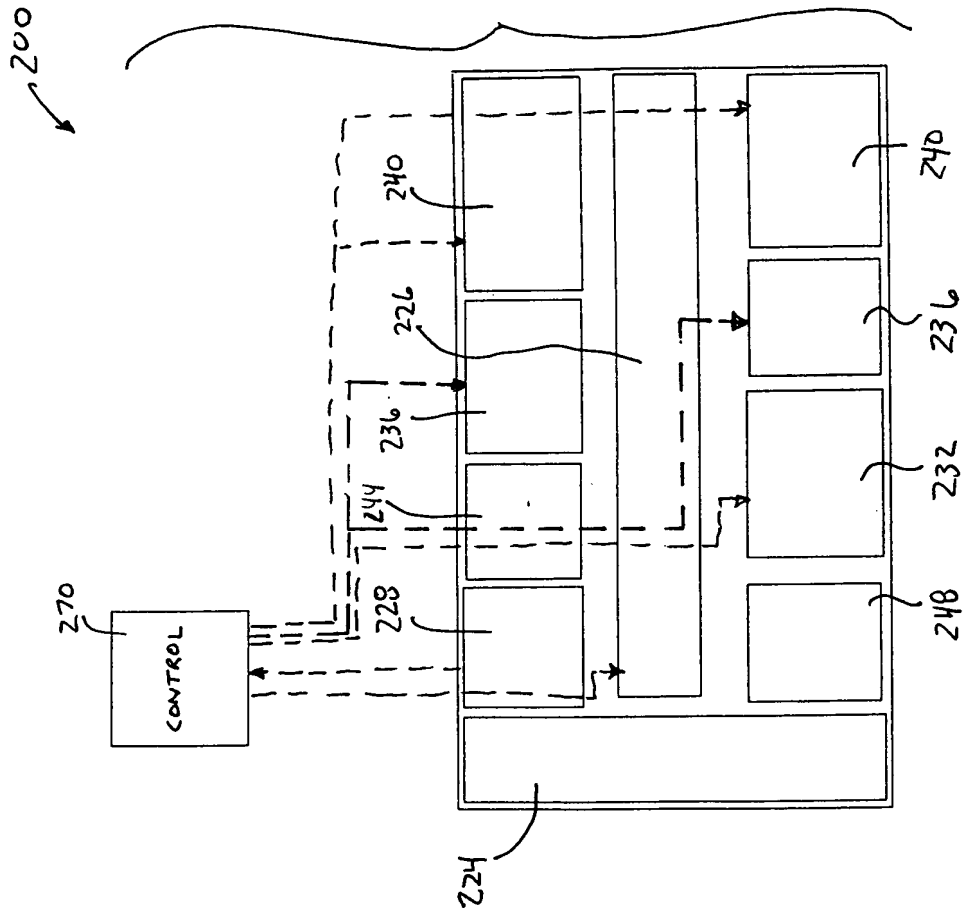


FIG. 1
PRIOR ART

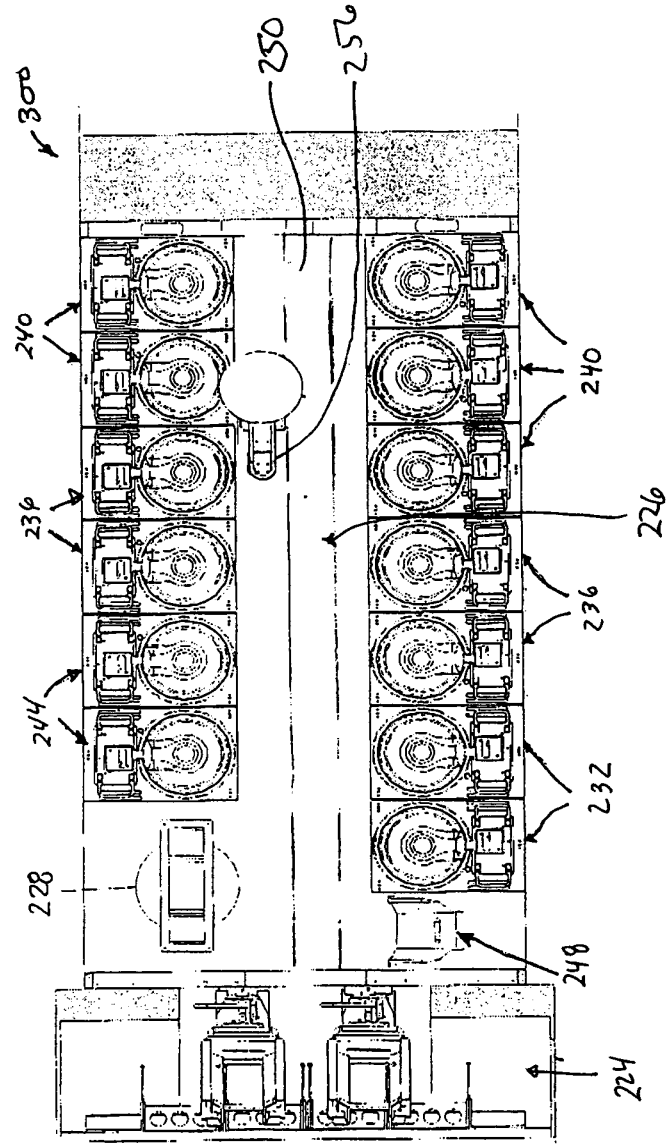
TOSHIBA 0096

FIG 2



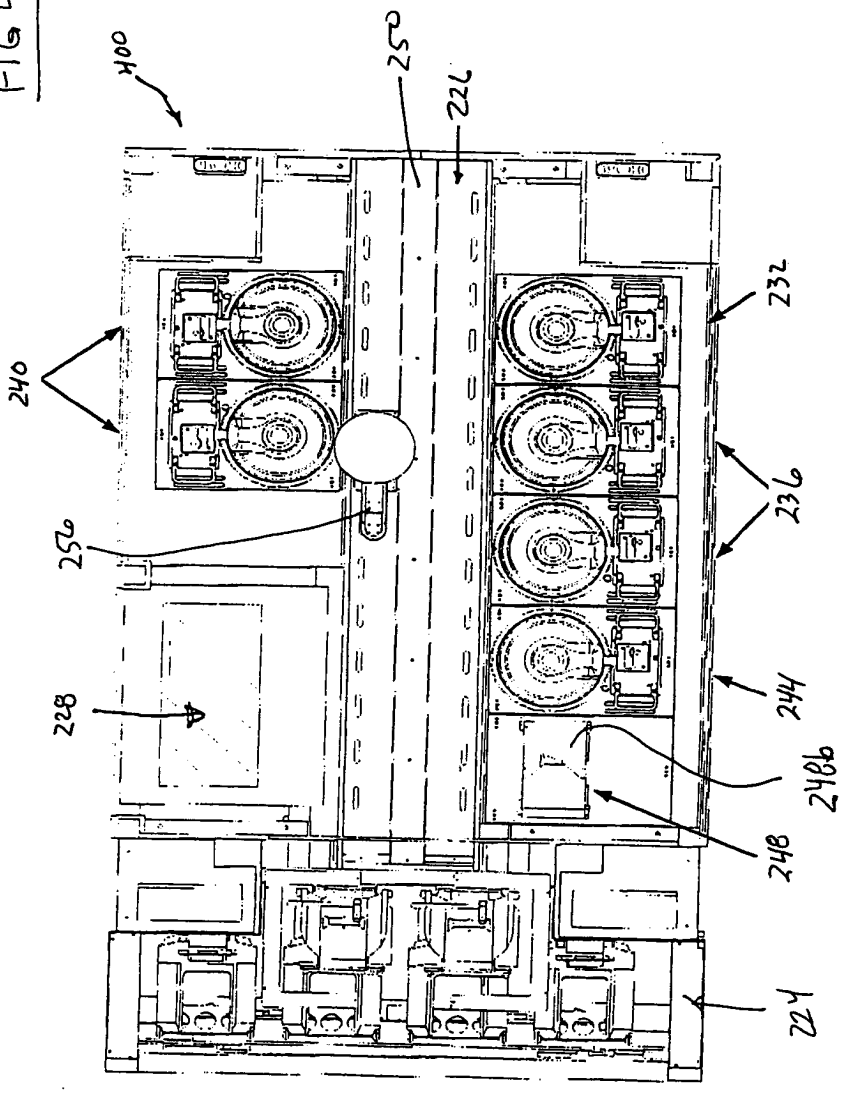
TO60/0 "Rec'd PCT/PTO 15 JUN 2006

FIG 3



T06020 PCT/US2006/060

FIG 4



09902491.070904

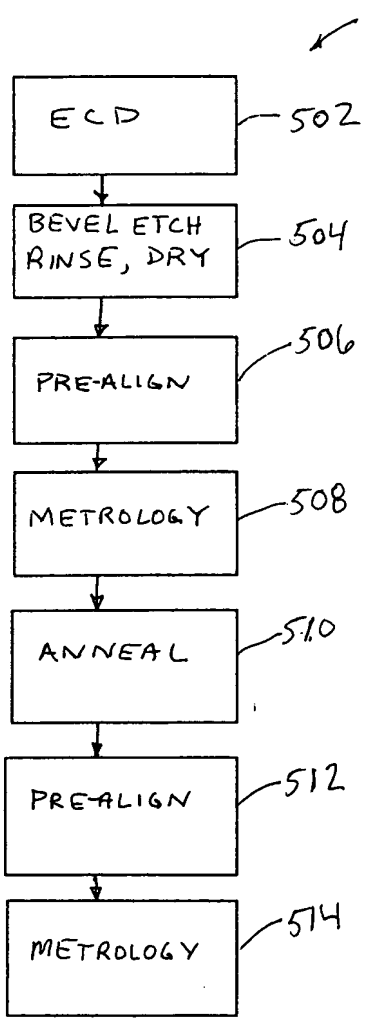


FIG 5

FP6070 PCT 20050

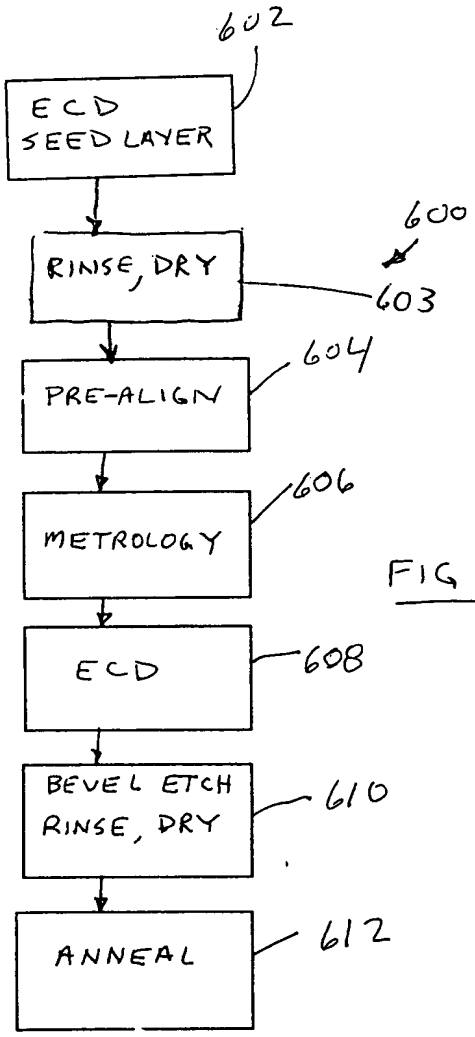


FIG 6

FOR OFFICIAL USE ONLY

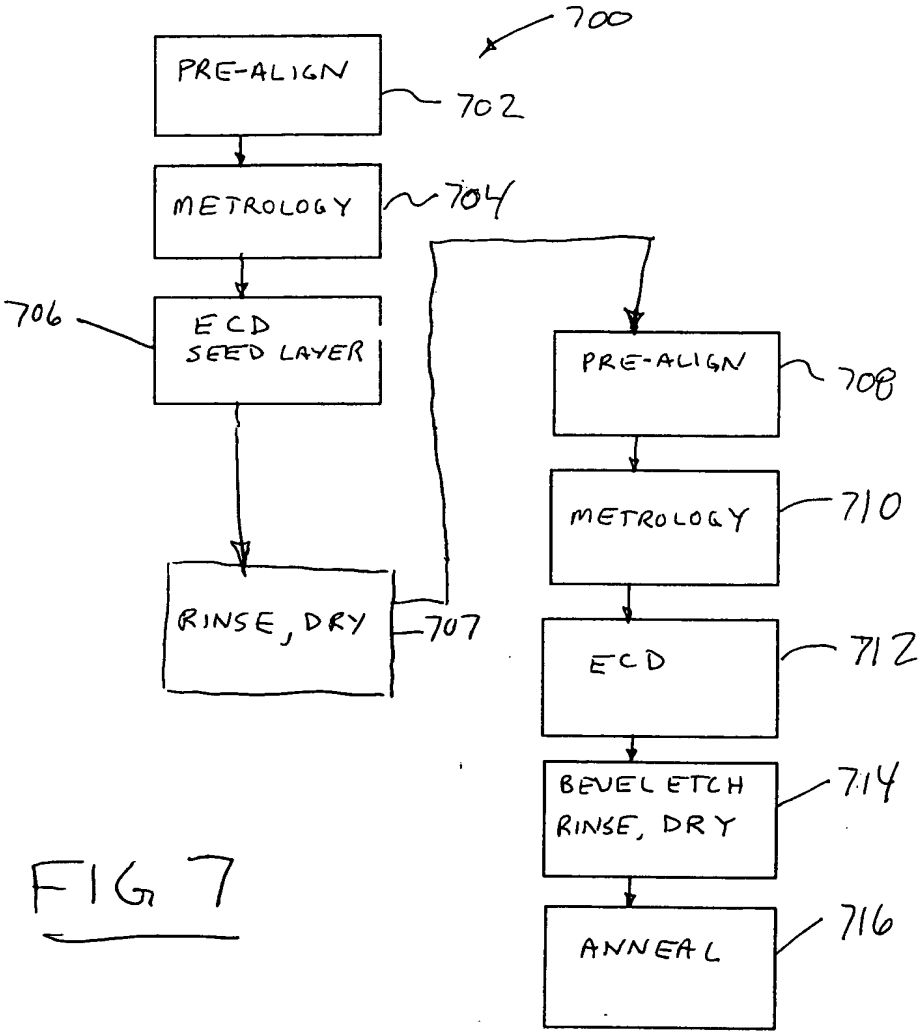


FIG 7

10/750,454 12/30/2003

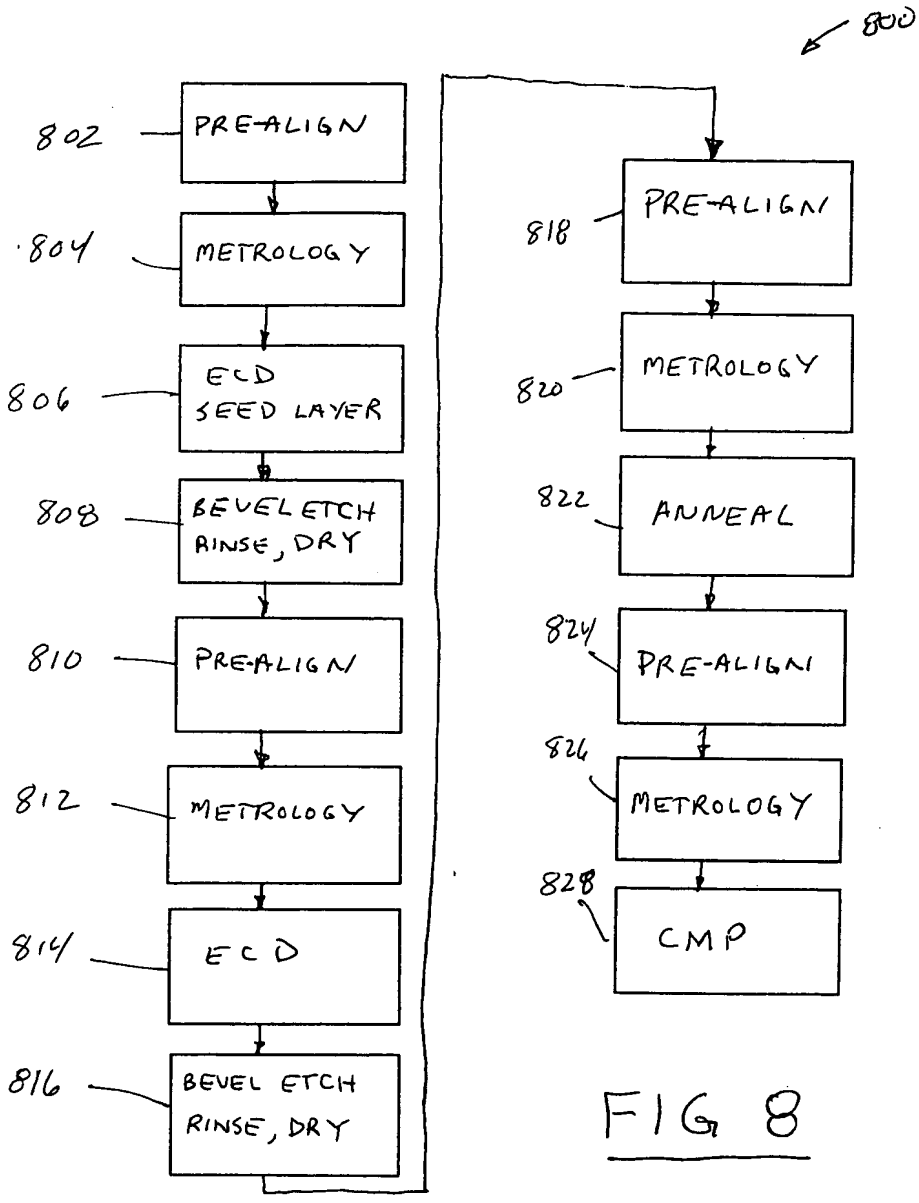


FIG 8

T0650/0-16+2050

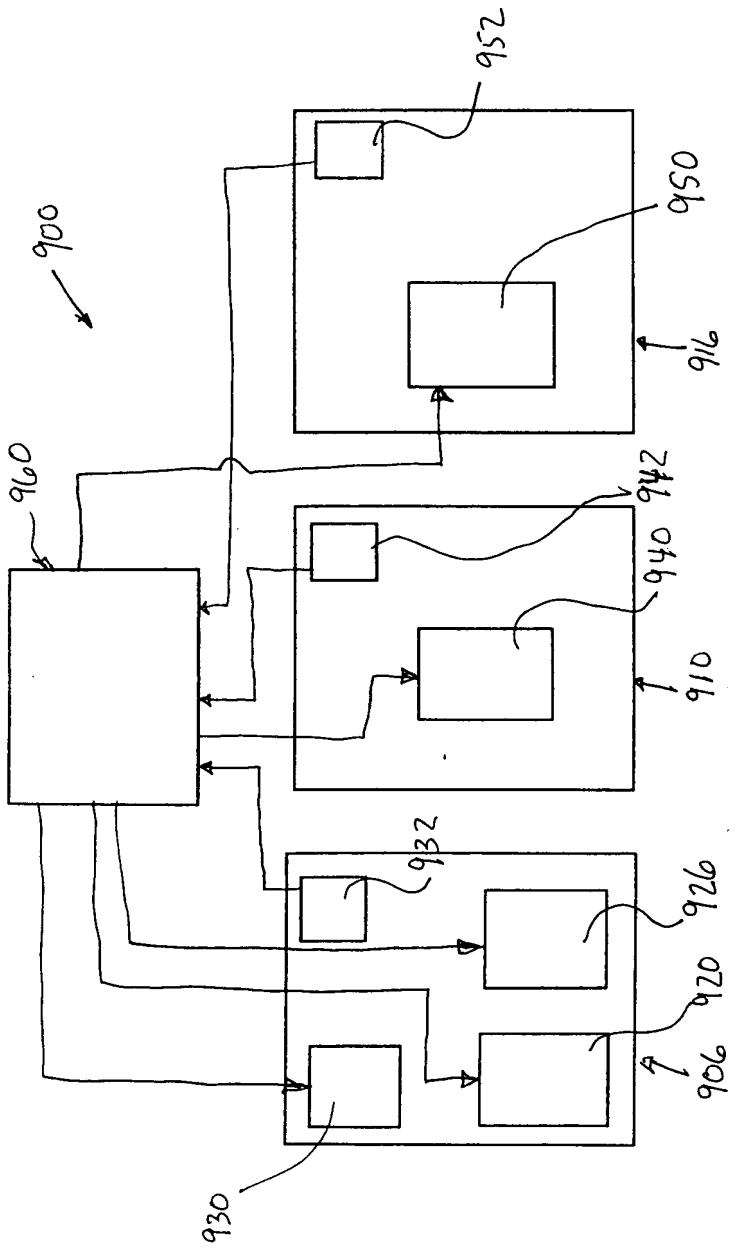


FIG 9

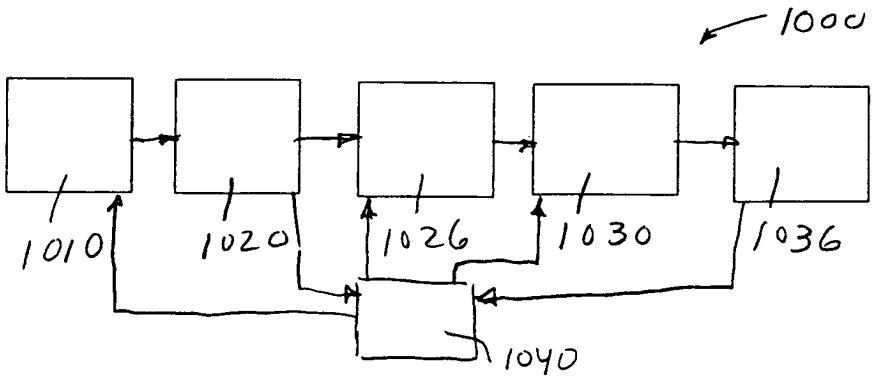


FIG 10

FOSTER-20060

FIG. A1A PRIOR ART

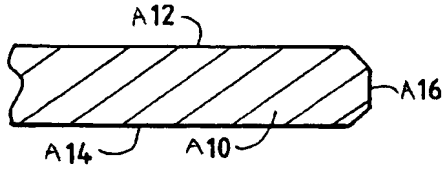


FIG. A2A

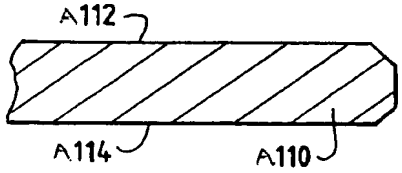


FIG. A1B PRIOR ART

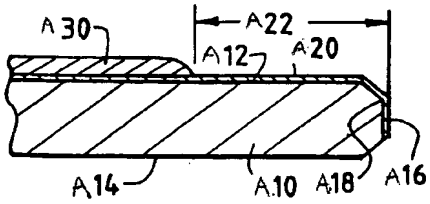


FIG. A2B

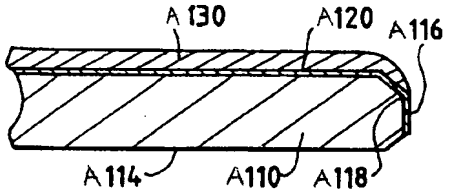


FIG. A1C PRIOR ART

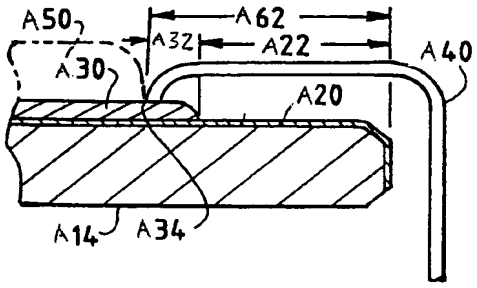


FIG. A2C

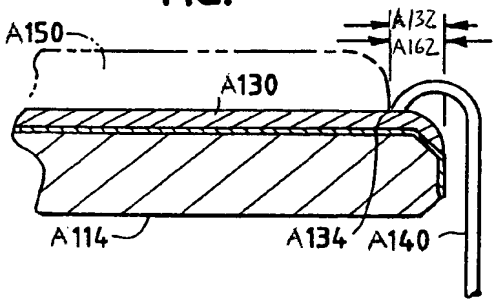


FIG. A1D PRIOR ART

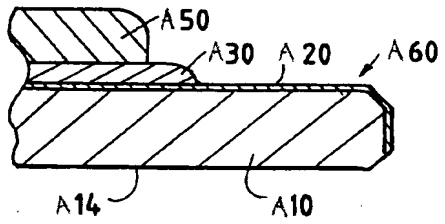
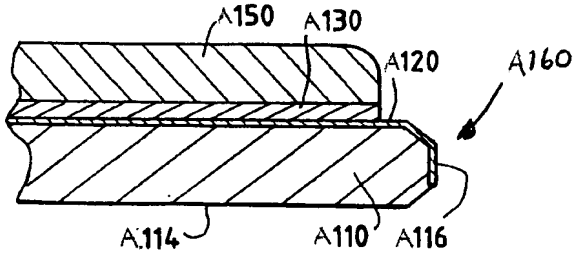
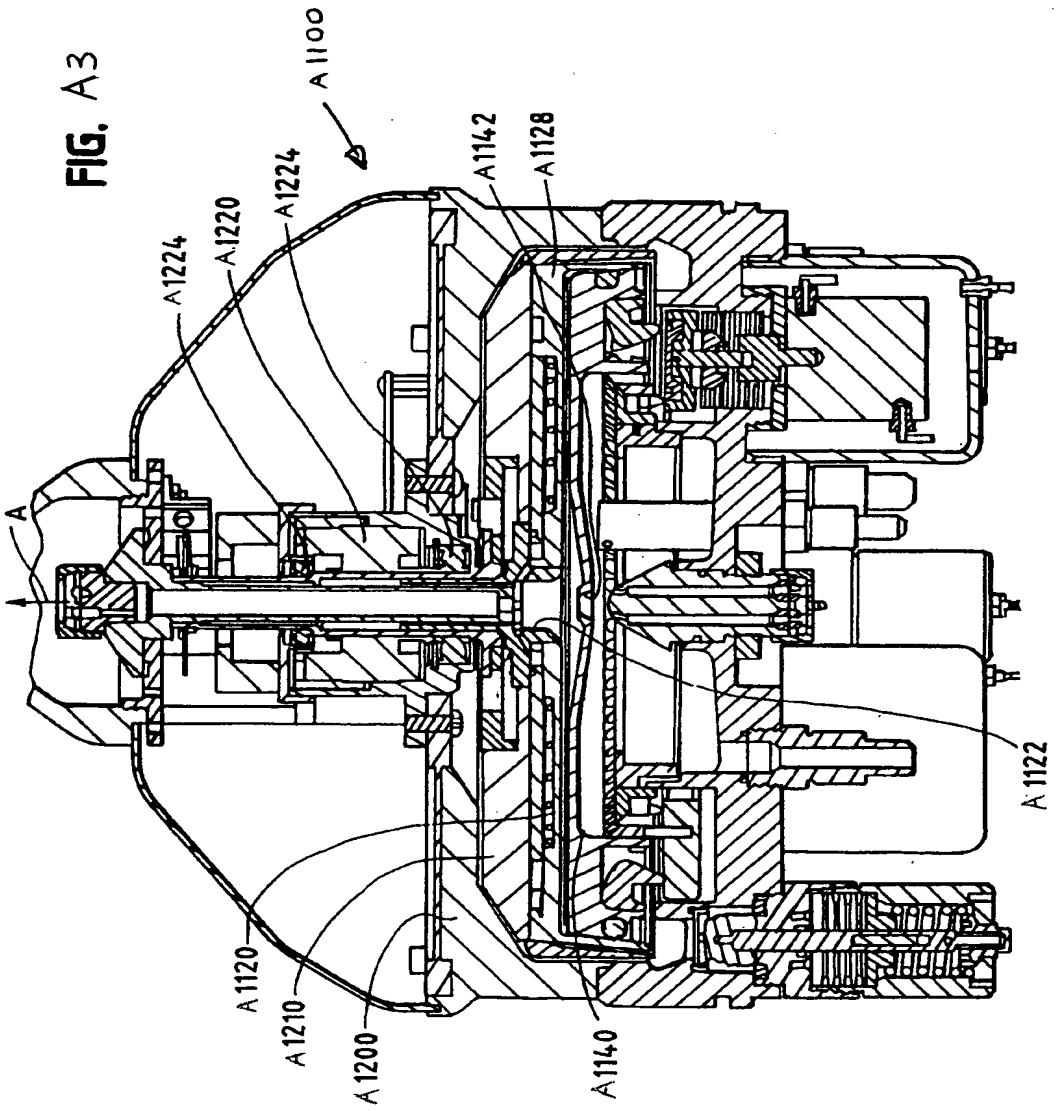


FIG. A2D



TD60/20: 16412059.0

FIG. A3



T06070" T64206G0

T06020" T6h20660

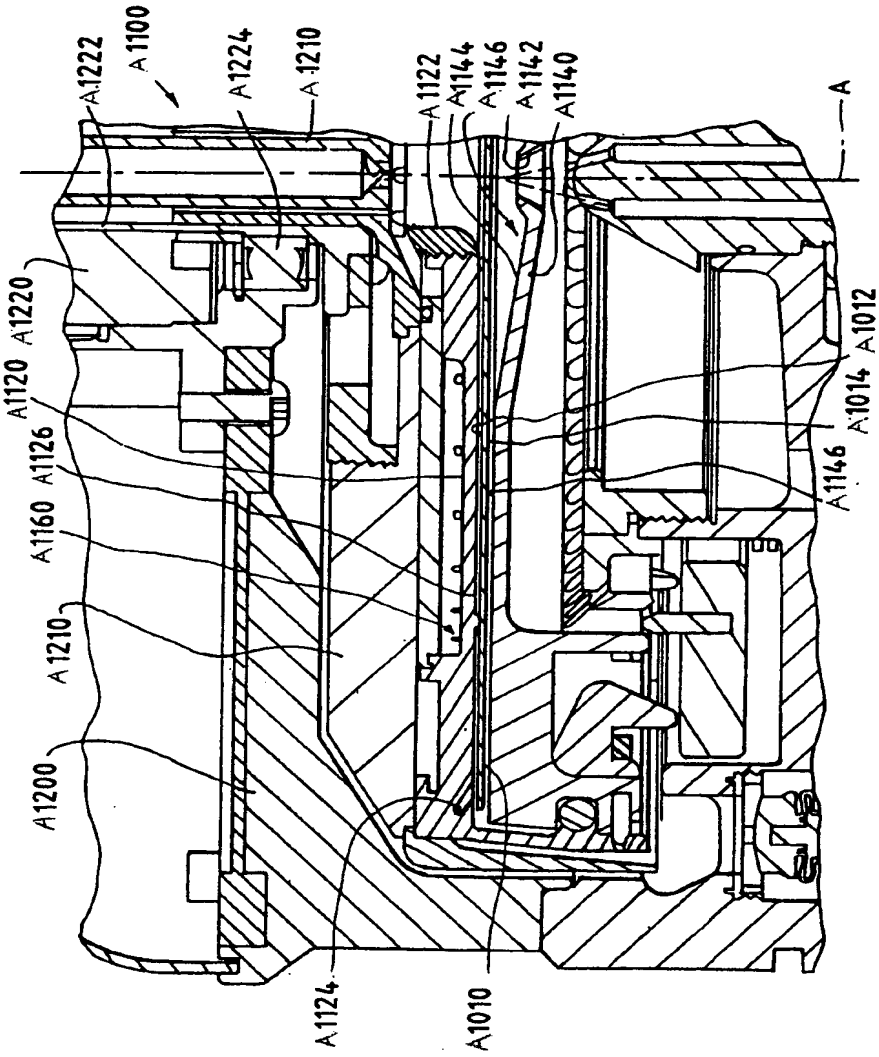


FIG. A4

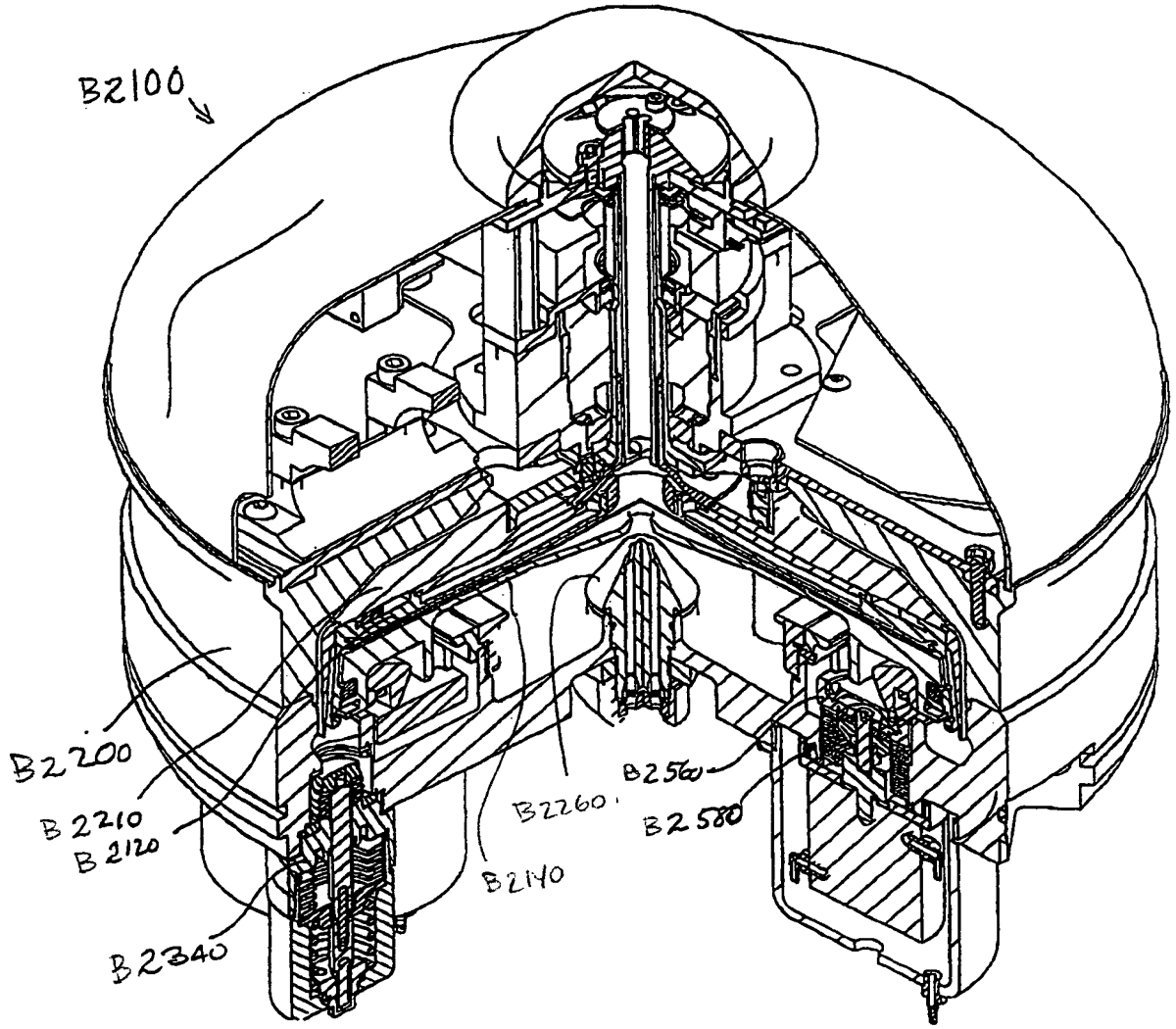


Fig. B1

TOSCO-01-T6420560

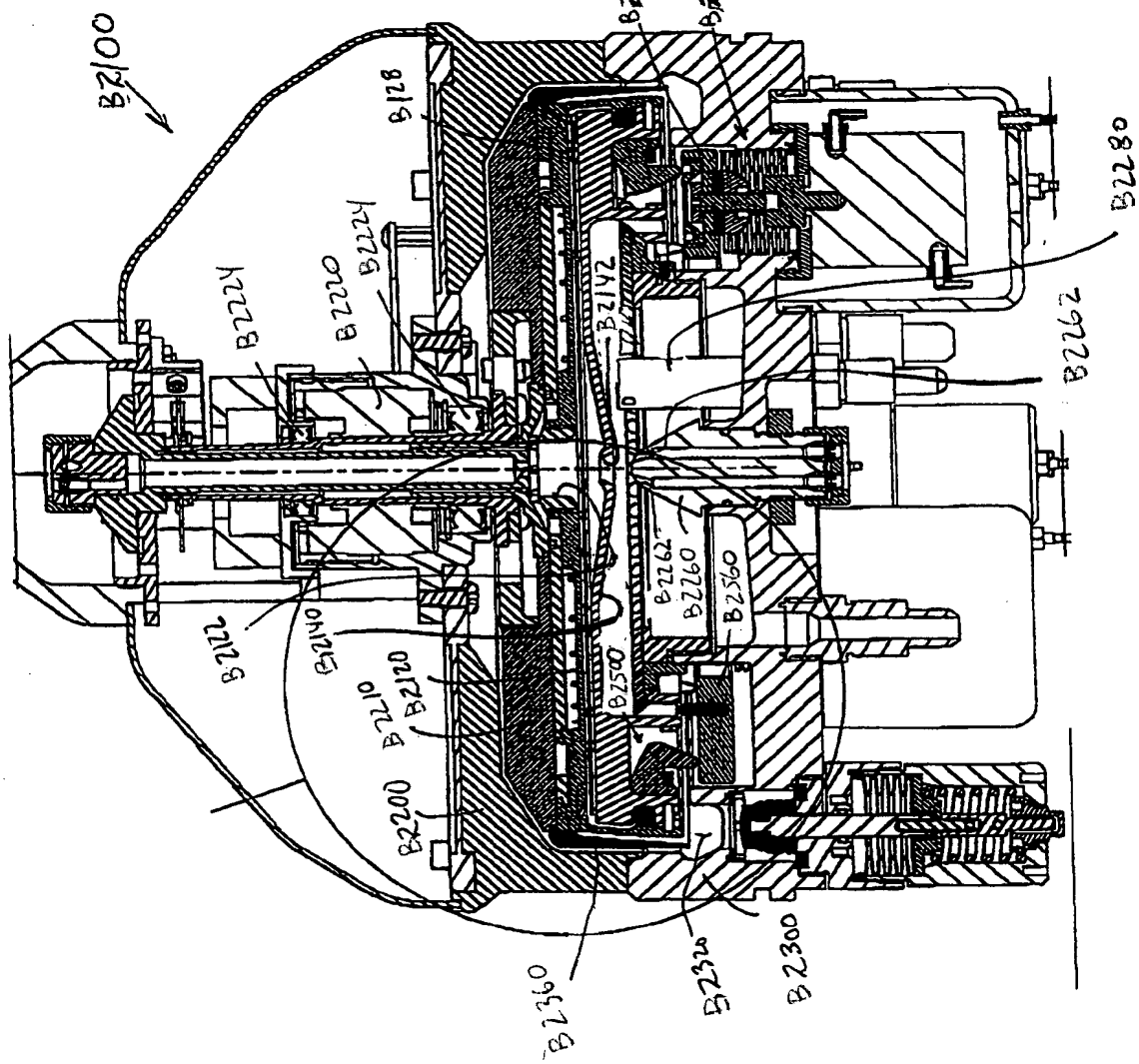
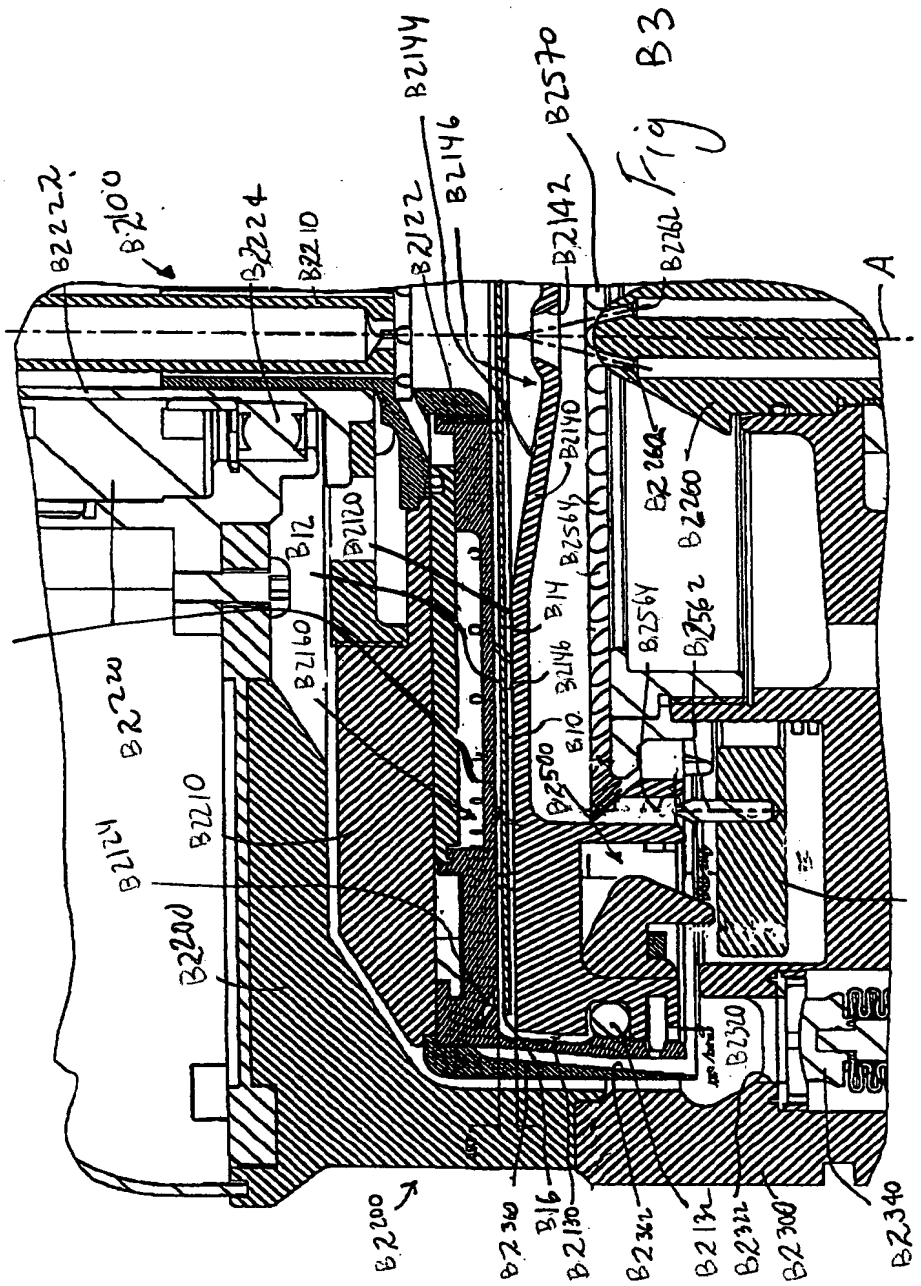

B2100
B128
B2224
B2220
B2224
B2560
B2580
B2280
B2262
B2142
B2262
B2260
B2560
B2500
B2110
B2120
B2200
B2360
B2320
B2300

Fig B2



T06/70" T6+20650

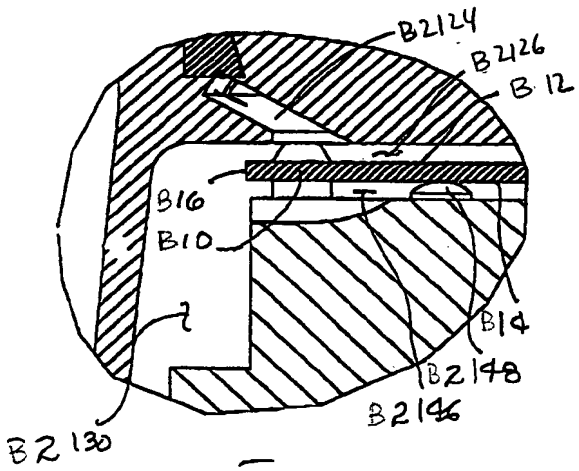


Fig. B4

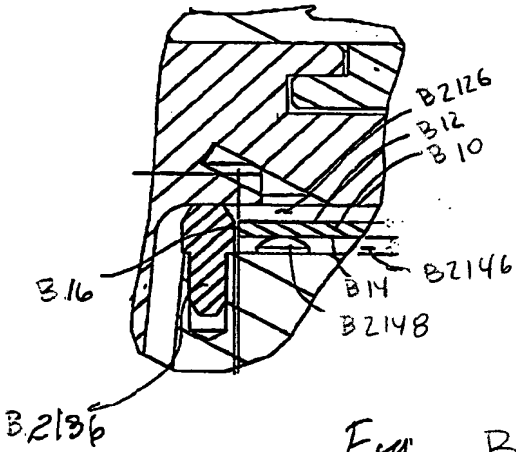


Fig. B5

10020-0951-US-0950

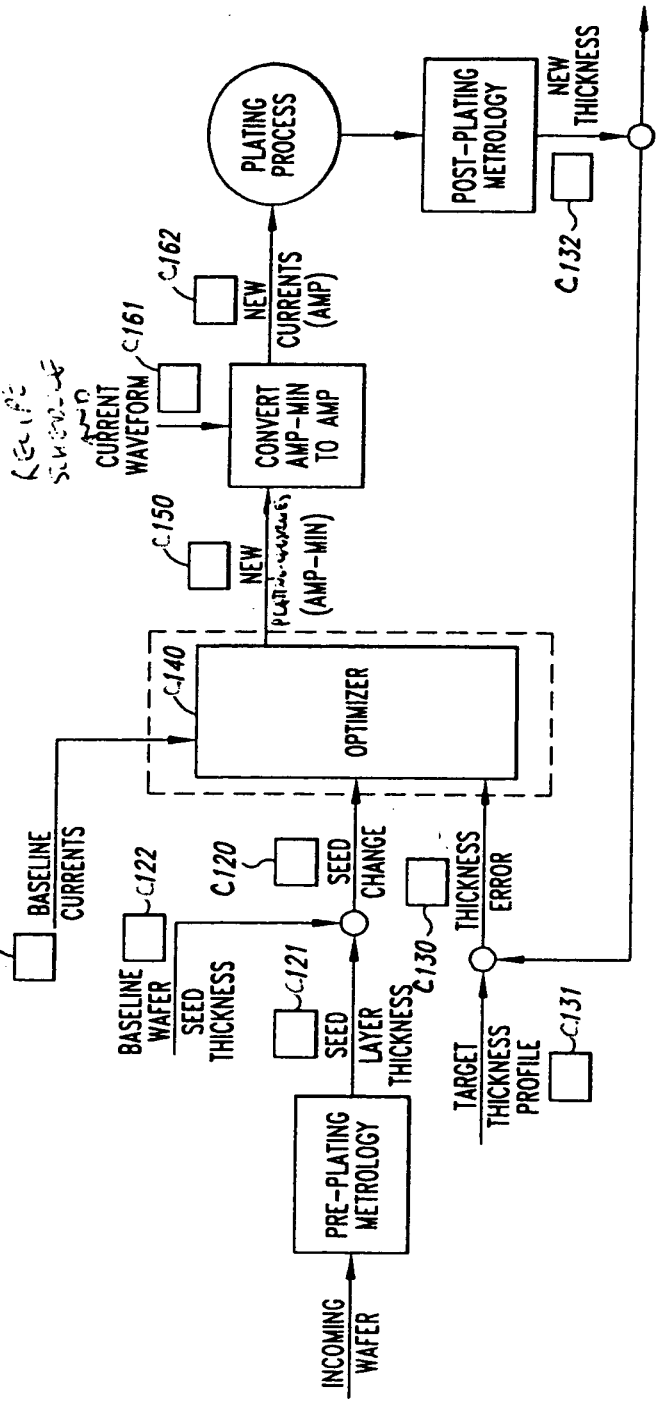

INCOMING WAFER
PRE-PLATING METROLOGY
SEED LAYER THICKNESS
C121
BASELINE WAFER SEED THICKNESS
C122
BASELINE CURRENTS
C110
C120
SEED CHANGE
C130
THICKNESS ERROR
TARGET THICKNESS PROFILE
C131
OPTIMIZER
C140
NEW (AMP-MIN)
C150
CONVERT AMP-MIN TO AMP
CURRENT WAVEFORM
C161
NEW CURRENTS (AMP)
C162
PLATING PROCESS
POST-PLATING METROLOGY
C132
NEW THICKNESS

Fig. C1

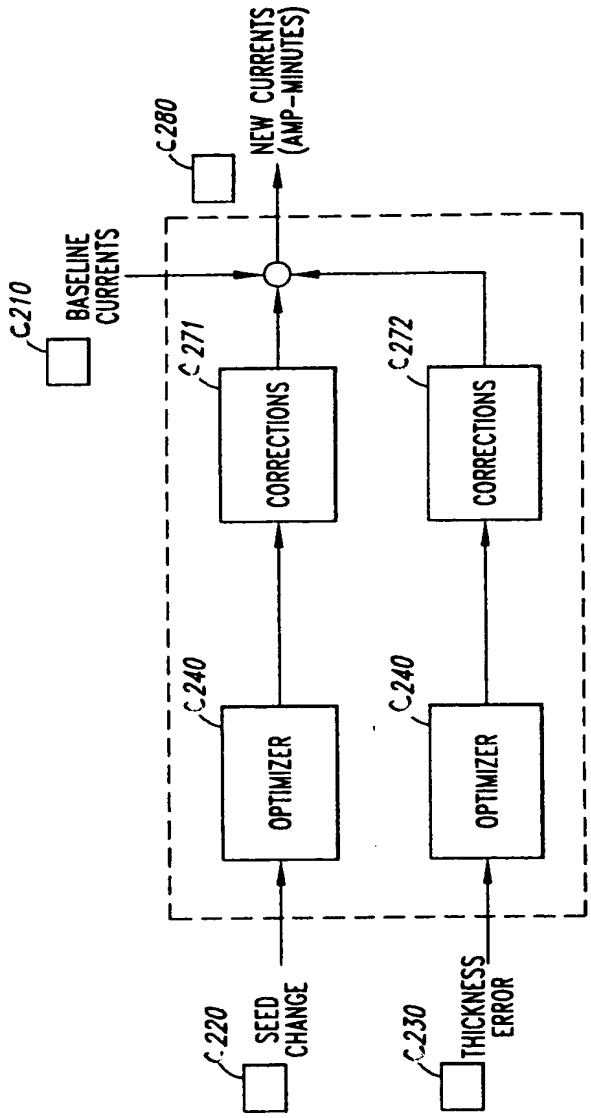

C280
NEW CURRENTS (AMP-MINUTES)
C210
BASELINE CURRENTS
C271
CORRECTIONS
C272
CORRECTIONS
C240
OPTIMIZER
C240
OPTIMIZER
C220
SEED CHANGE
C230
THICKNESS ERROR

Fig. C2

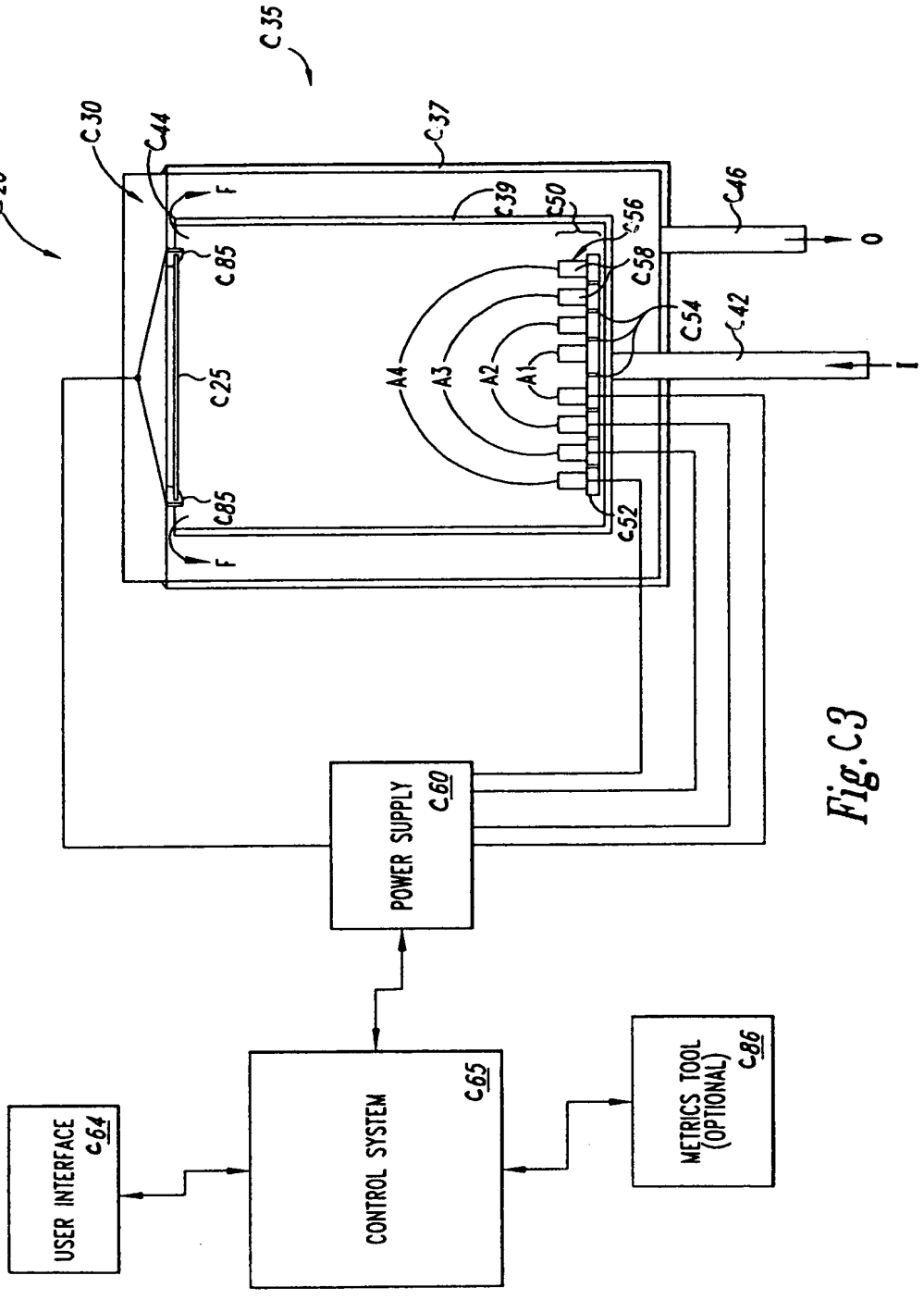

C35
C30
C44
C37
C20
C39
C50
C56
C46
C85
C58
C54
C42
C25
A4
A3
A2
A1
C52
F
O
I
POWER SUPPLY
C60
USER INTERFACE
C64
CONTROL SYSTEM
C65
METRICS TOOL
(OPTIONAL)
C86

Fig. C3

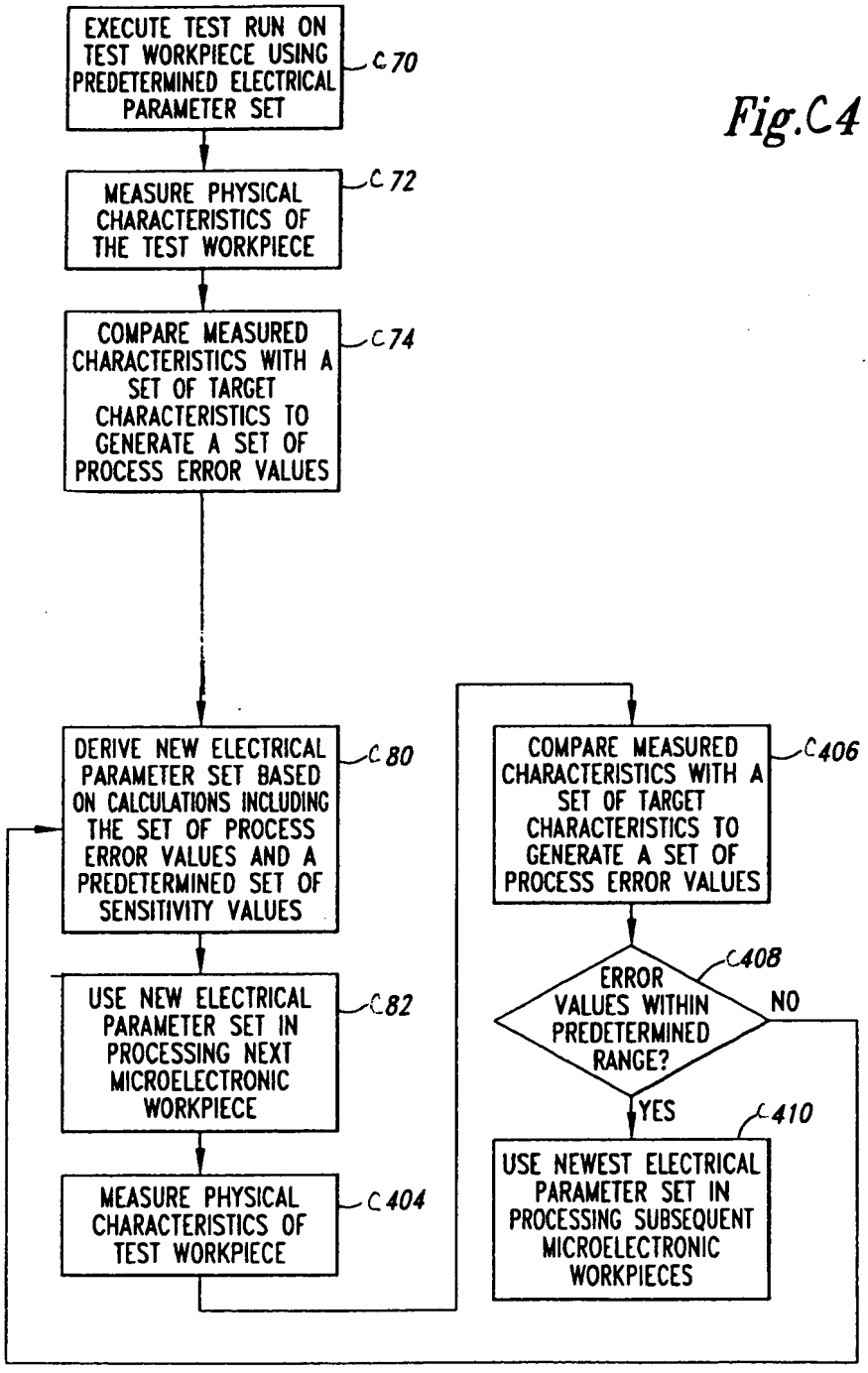


Fig.C4

EP 0 907 204 A2

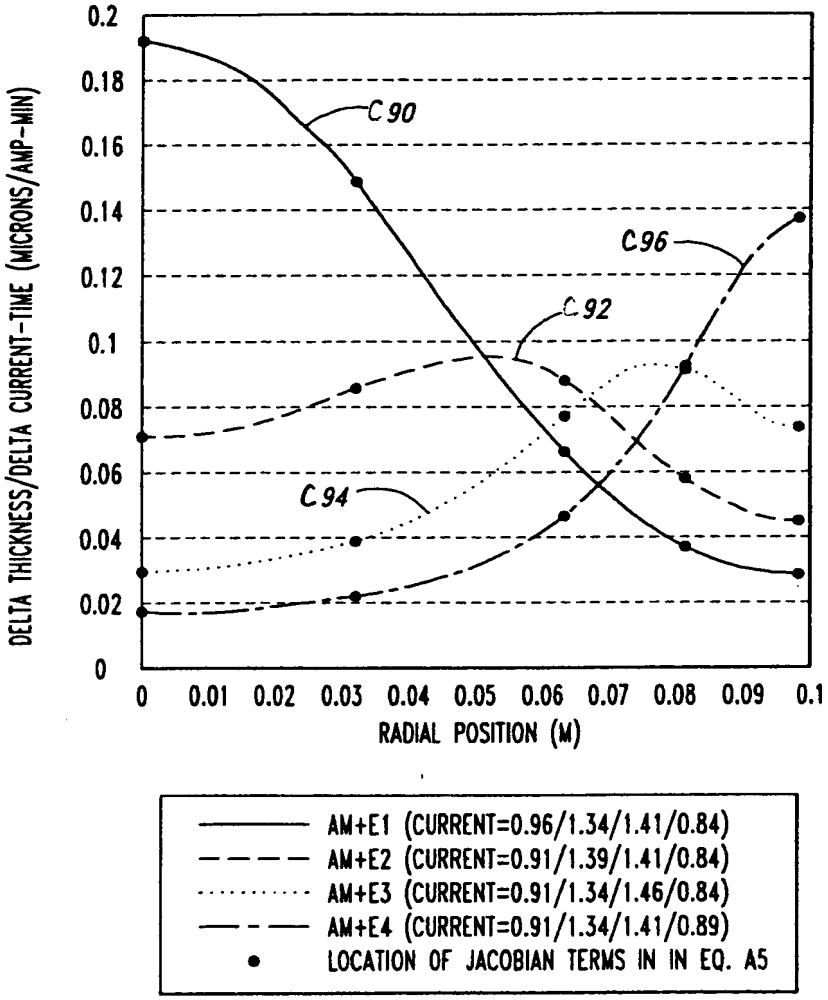


Fig.C5

Fo69Z0" T6th20660

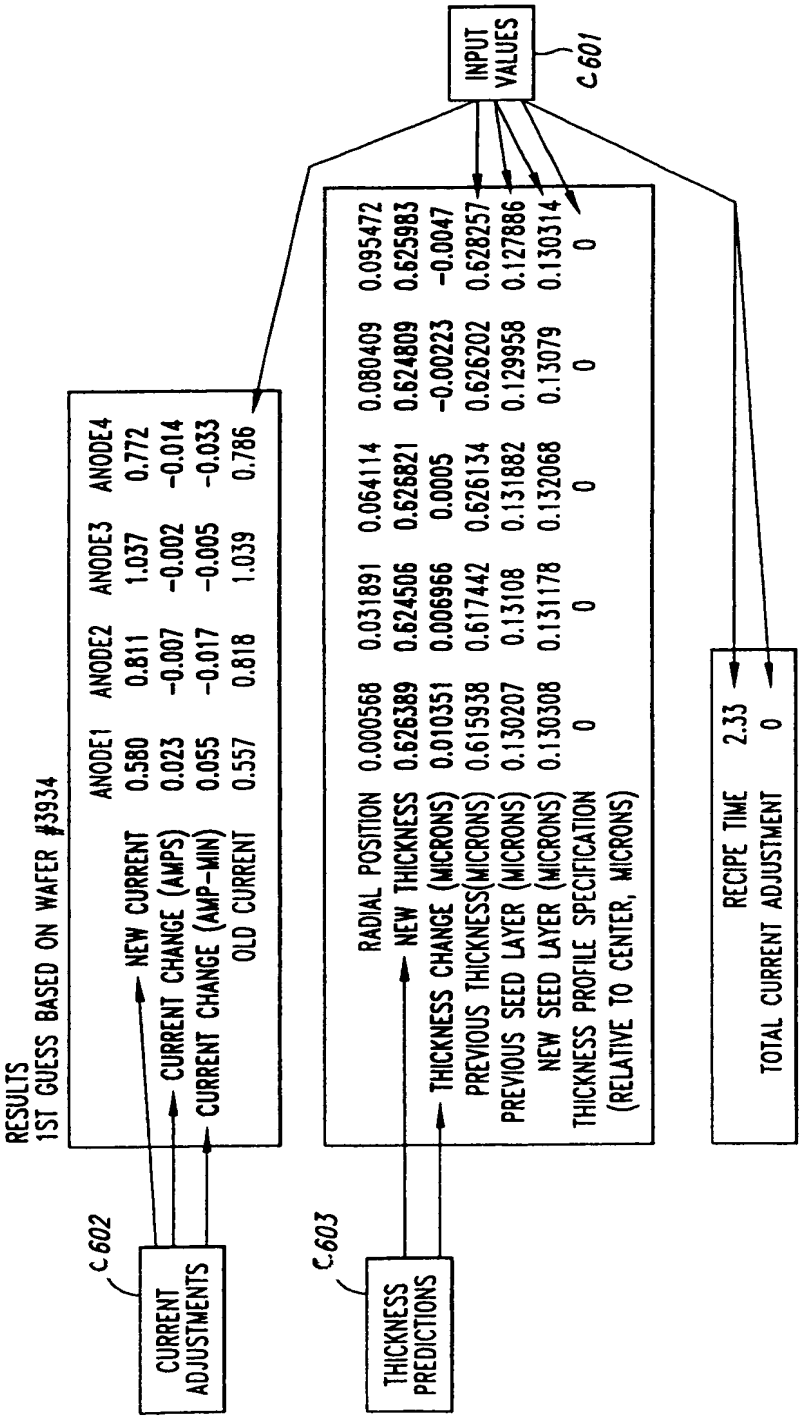

INPUT VALUES
c.601
RESULTS
1ST GUESS BASED ON WAFER #3934
ANODE1 ANODE2 ANODE3 ANODE4
NEW CURRENT 0.580 0.811 1.037 0.772
CURRENT CHANGE (AMPS) 0.023 -0.007 -0.002 -0.014
CURRENT CHANGE (AMP-MIN) 0.055 -0.017 -0.005 -0.033
OLD CURRENT 0.557 0.818 1.039 0.786
RADIAL POSITION 0.000568 0.031891 0.064114 0.080409 0.095472
NEW THICKNESS 0.626389 0.624506 0.628821 0.624809 0.625983
THICKNESS CHANGE (MICRONS) 0.010351 0.006966 0.0005 -0.00223 -0.0047
PREVIOUS THICKNESS(MICRONS) 0.615938 0.617442 0.626134 0.626202 0.628257
PREVIOUS SEED LAYER (MICRONS) 0.130207 0.13108 0.131882 0.129958 0.127886
NEW SEED LAYER (MICRONS) 0.130308 0.131178 0.132068 0.13079 0.130314
THICKNESS PROFILE SPECIFICATION (RELATIVE TO CENTER, MICRONS) 0 0 0 0 0
RECIPE TIME 2.33
TOTAL CURRENT ADJUSTMENT 0
c.602
CURRENT ADJUSTMENTS
c.603
THICKNESS PREDICTIONS

Fig. 6

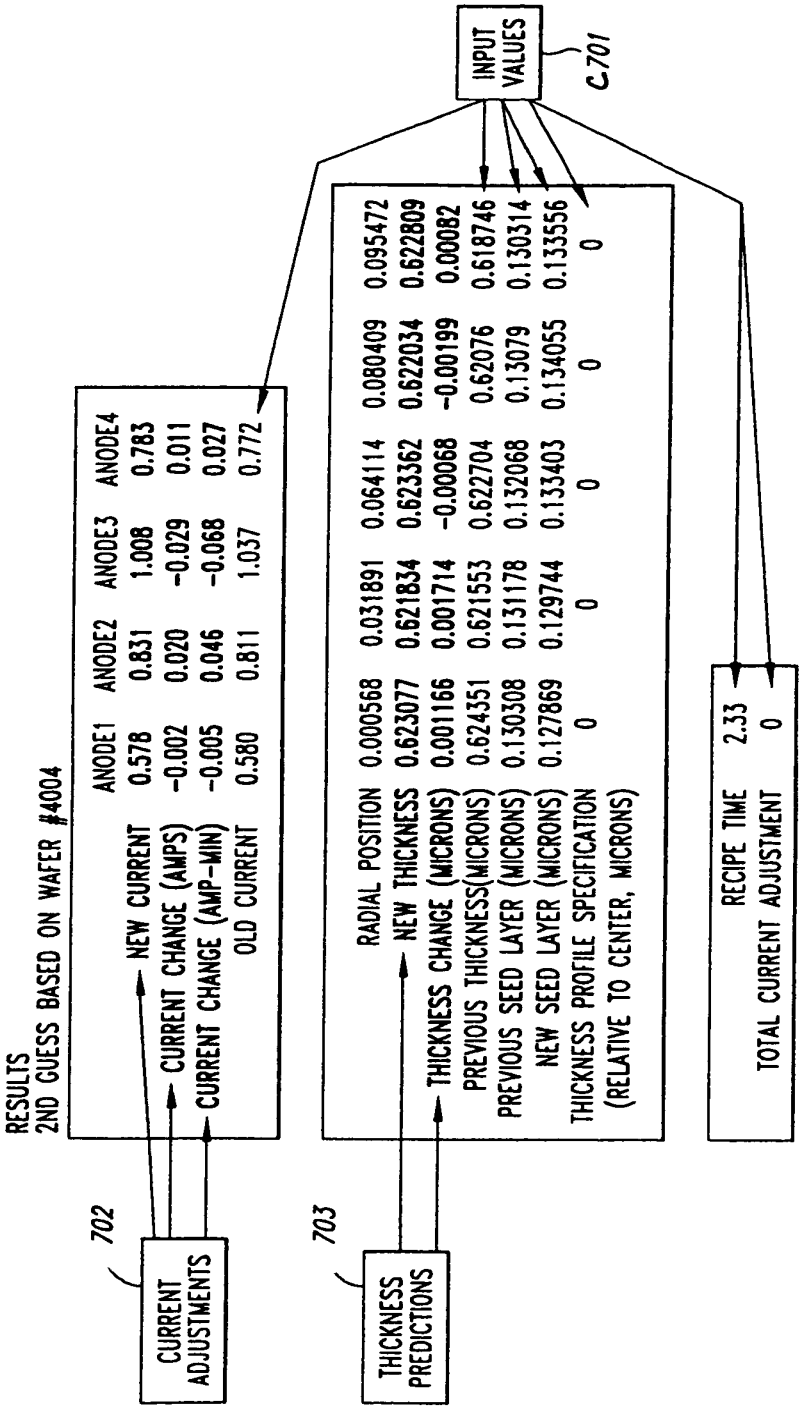

INPUT VALUES
701
RESULTS
2ND GUESS BASED ON WAFER #4004
ANODE1 ANODE2 ANODE3 ANODE4
NEW CURRENT 0.578 0.831 1.008 0.783
CURRENT CHANGE (AMPS) -0.002 0.020 -0.029 0.011
CURRENT CHANGE (AMP-MIN) -0.005 0.046 -0.068 0.027
OLD CURRENT 0.580 0.811 1.037 0.772
RADIAL POSITION 0.000568 0.031891 0.064114 0.080409 0.095472
NEW THICKNESS 0.623077 0.621834 0.623362 0.622034 0.622809
THICKNESS CHANGE (MICRONS) 0.001166 0.001714 -0.00068 -0.00199 0.00082
PREVIOUS THICKNESS(MICRONS) 0.624351 0.621553 0.622704 0.62076 0.618746
PREVIOUS SEED LAYER (MICRONS) 0.130308 0.131178 0.132068 0.13079 0.130314
NEW SEED LAYER (MICRONS) 0.127869 0.129744 0.133403 0.134055 0.133556
THICKNESS PROFILE SPECIFICATION (RELATIVE TO CENTER, MICRONS) 0 0 0 0 0
RECIPE TIME 2.33
TOTAL CURRENT ADJUSTMENT 0
CURRENT ADJUSTMENTS
702
THICKNESS PREDICTIONS
703

Fig.C7

FIGUREC8

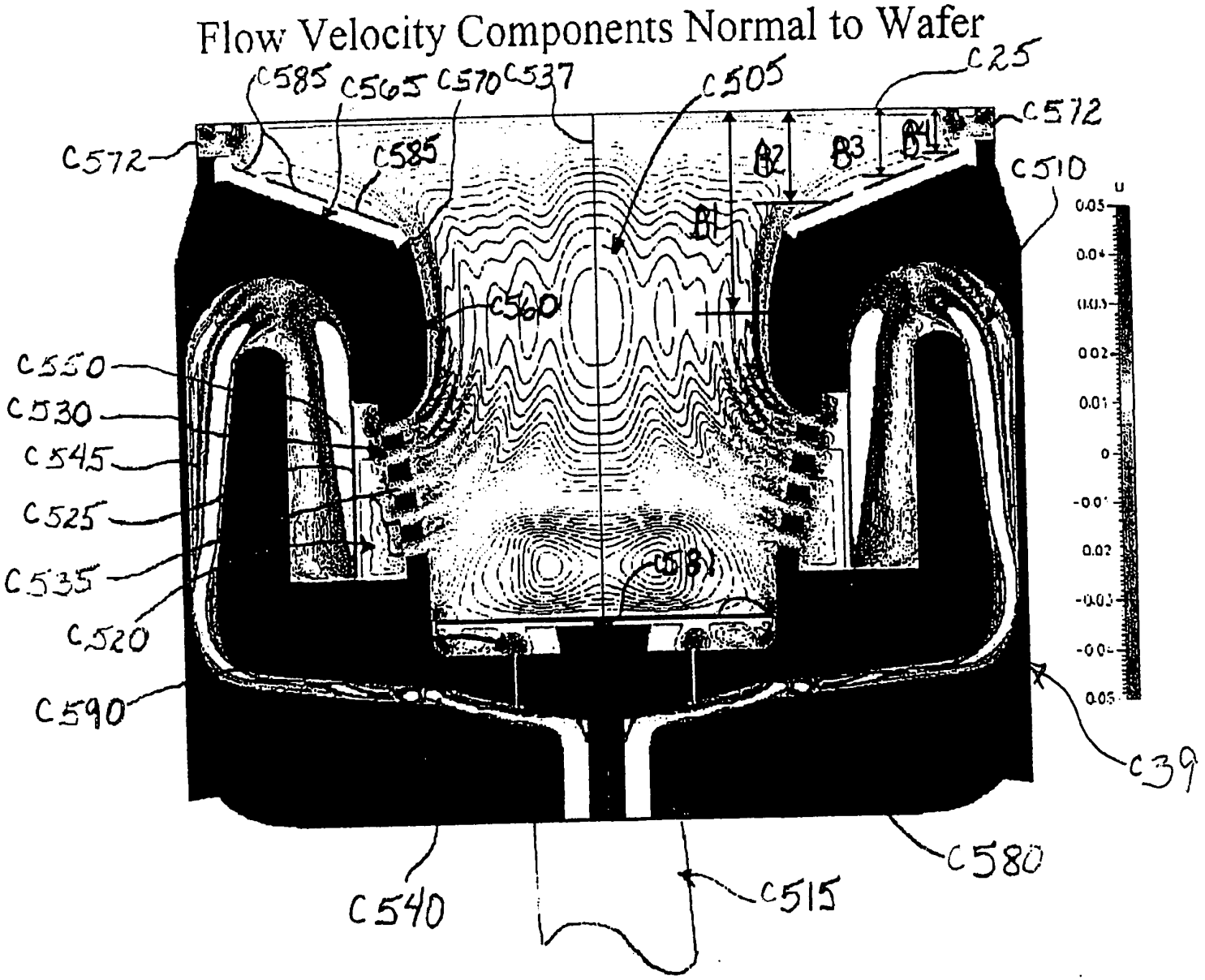
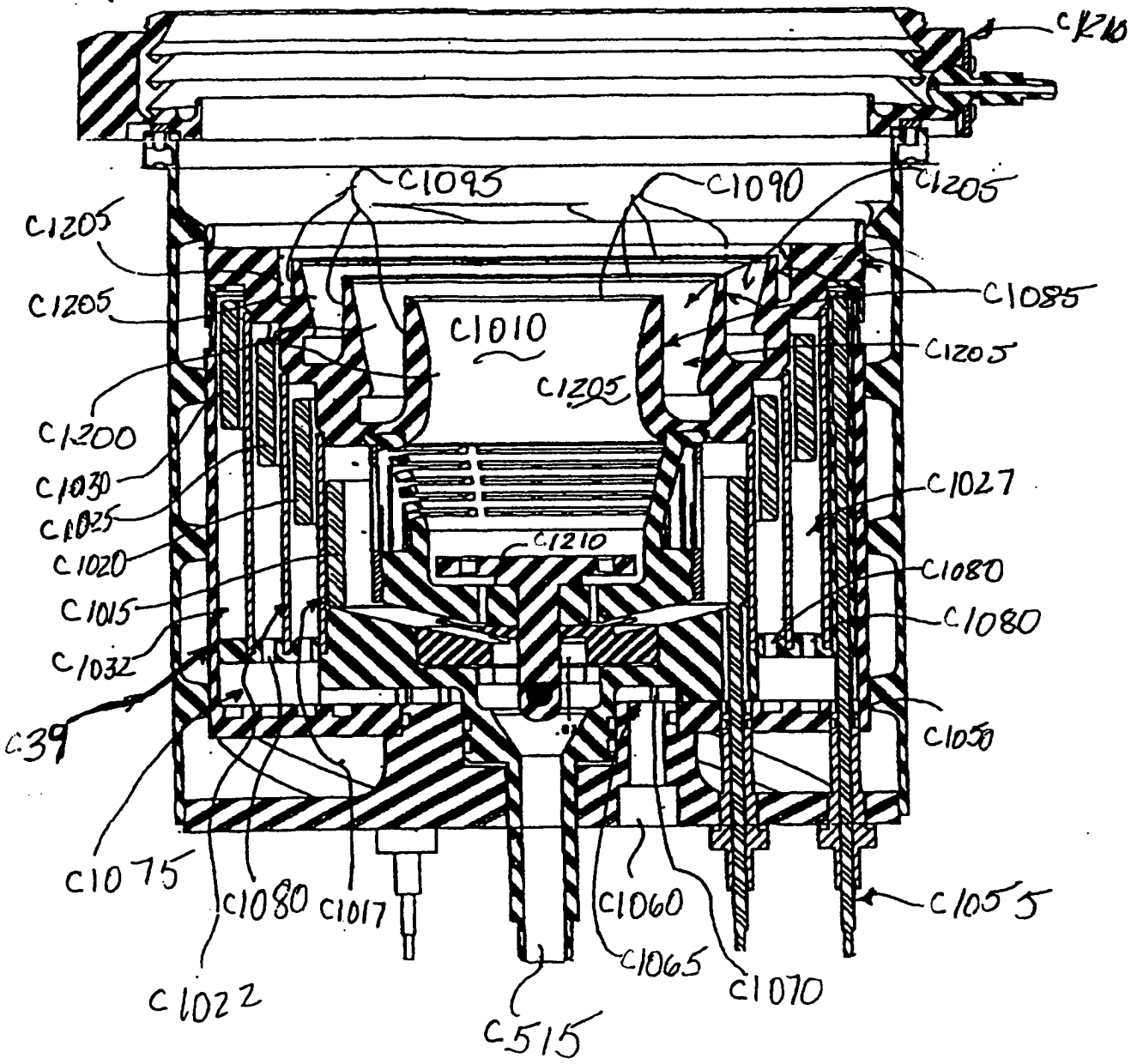

Flow Velocity Components Normal to Wafer
C585
C565
C570
C537
C505
C25
C572
C572
C585
C572
C510
B1
B2
B3
B4
C560
C550
C530
C545
C525
C535
C520
C590
C531
C39
C580
C540
C515
u
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05

FIGURE C9



FOSTER-T6420660

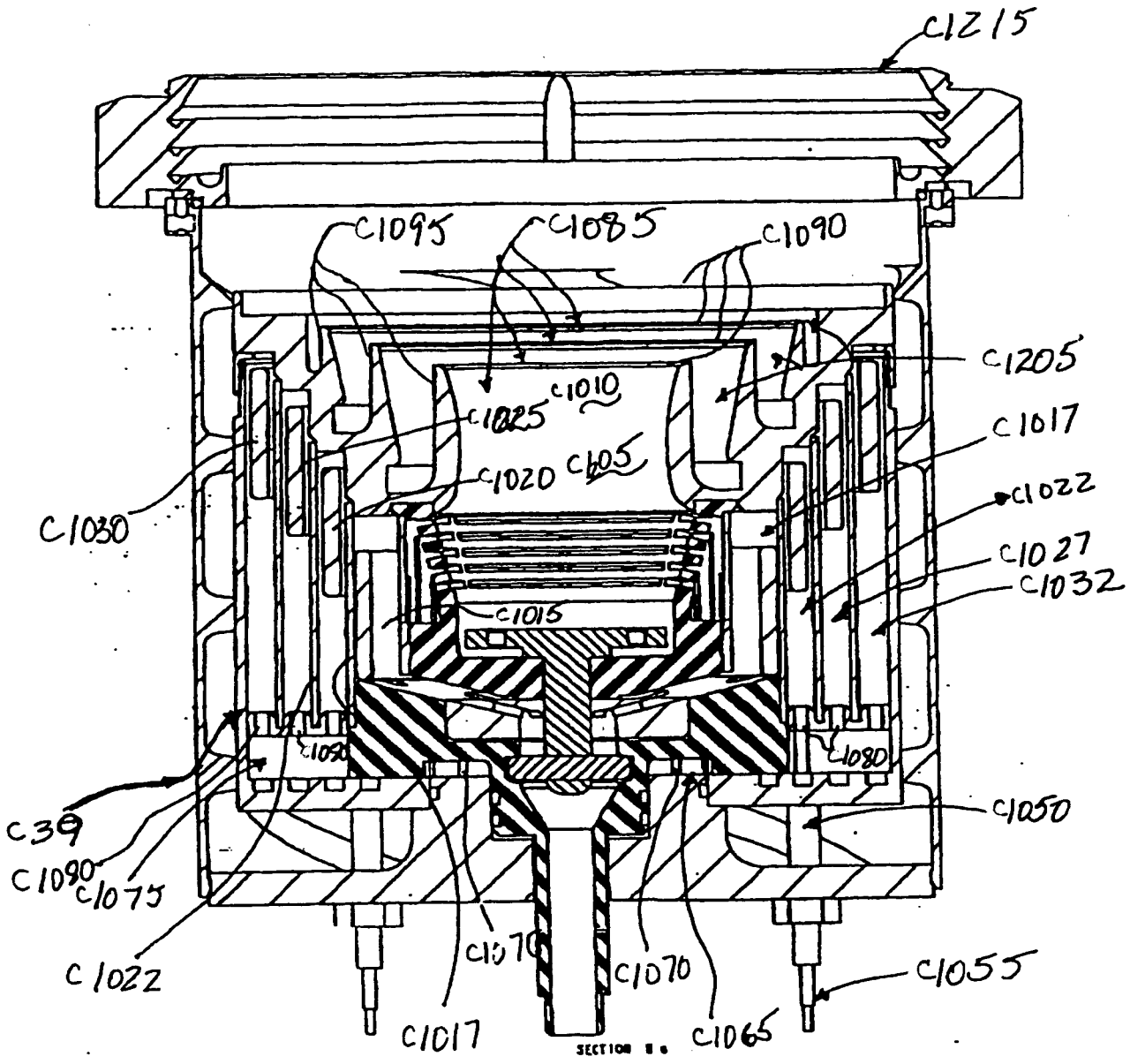


FIGURE C10

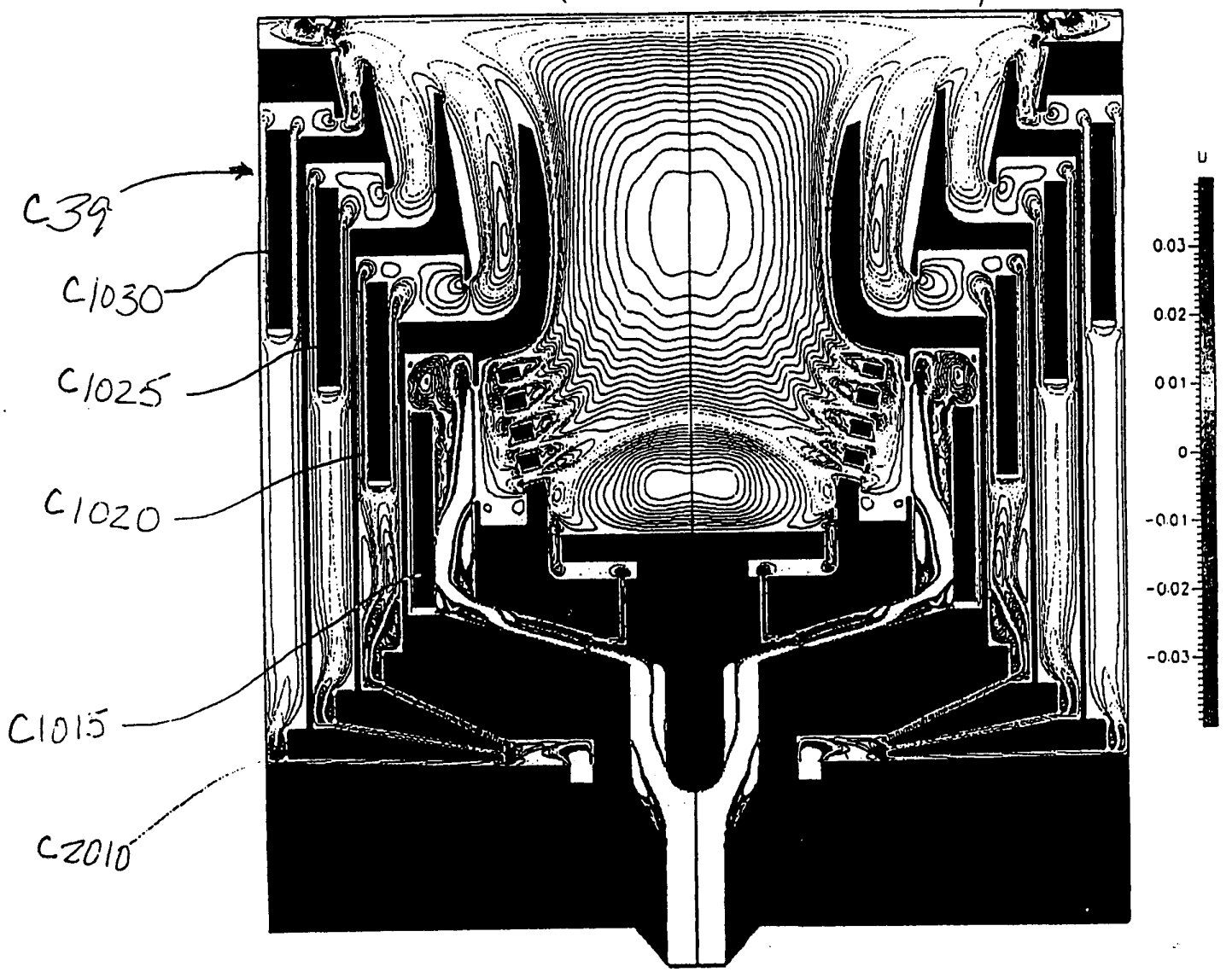
T06020: Fsh2d650

Workpiece Normal Velocity Contours

Two Flow Paths Refreshing Anodes

(Scale -0.05 to 0.05 m/sec)

FIGURE C11



Workpiece-Normal Velocity Contours

Single Flow Path (No Flow Over Anodes)

(Scale -0.05 to 0.05 m/sec)

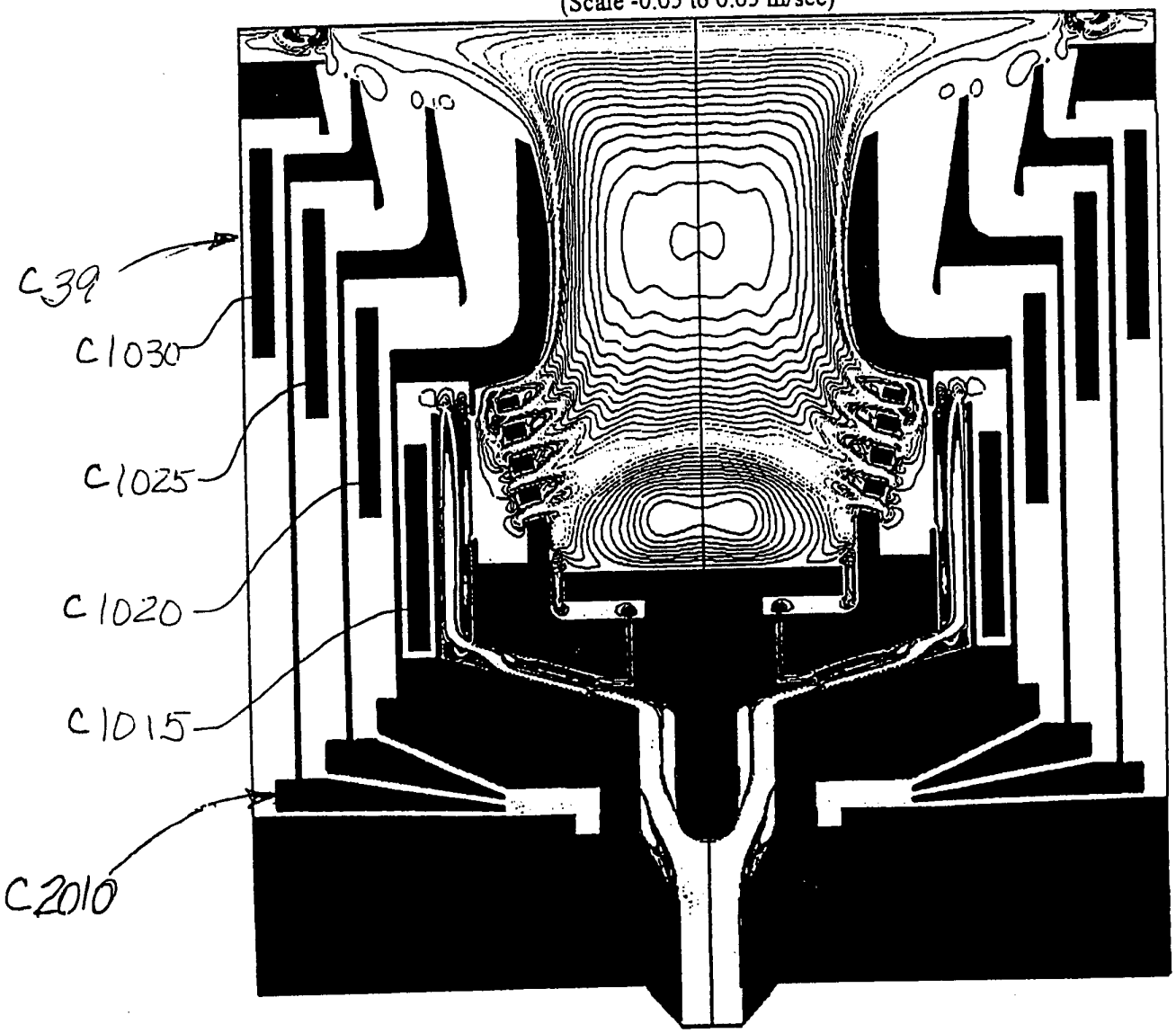
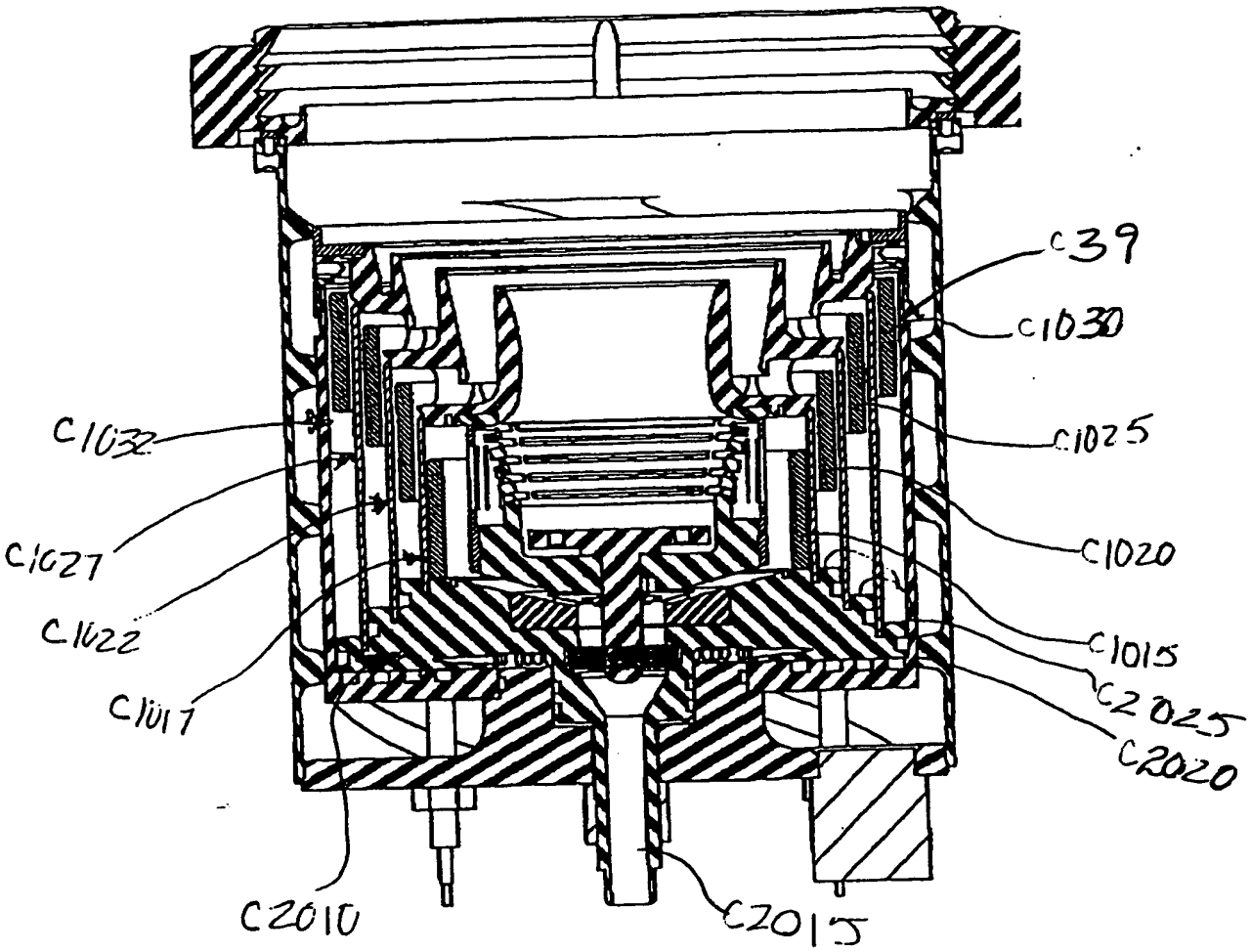


FIGURE C12

FIGURE C13



EP0906950A1

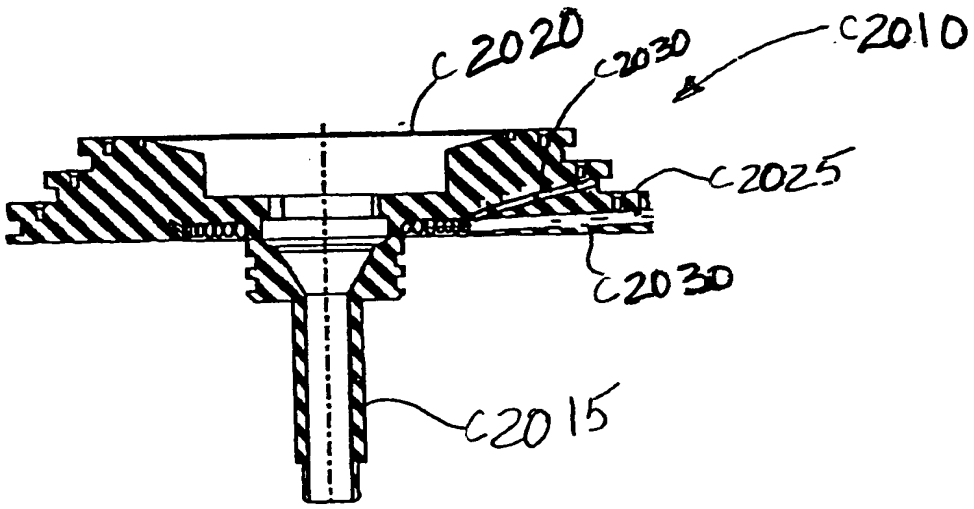
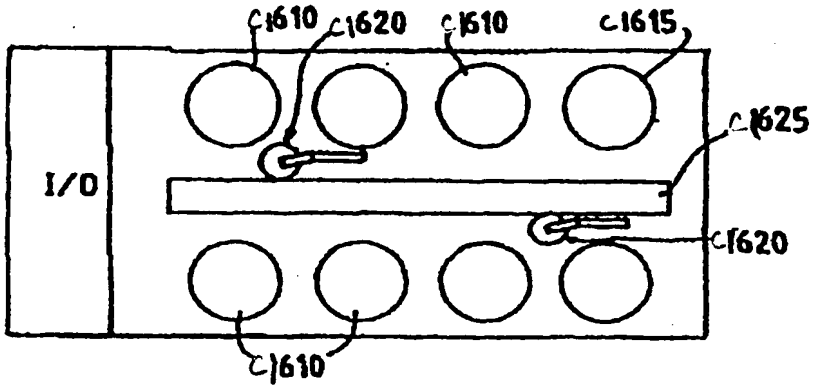


FIGURE C14

T060420" T64205G0

FIG.C15



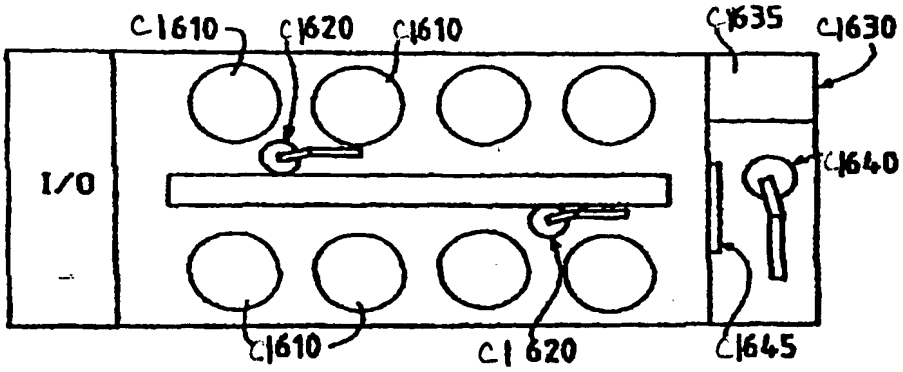


FIG.C16

FOR 2.0: 15+20650

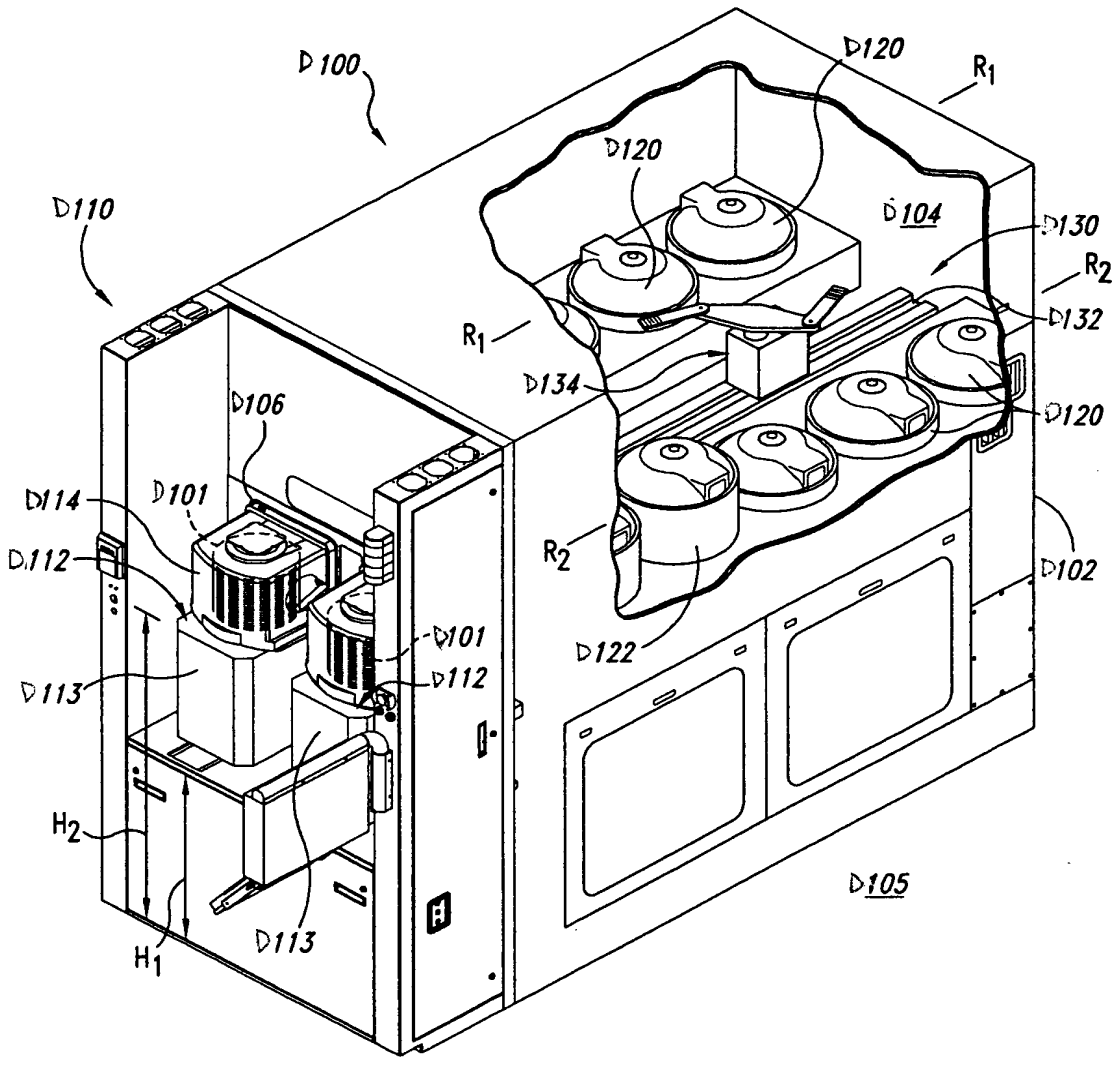

D100
D110
D120
R1
D120
D104
D130
R2
D132
R1
D134
D120
D106
D114
D101
D112
R2
D102
D101
D112
D122
D113
H2
D105
D113
H1

Fig. D1

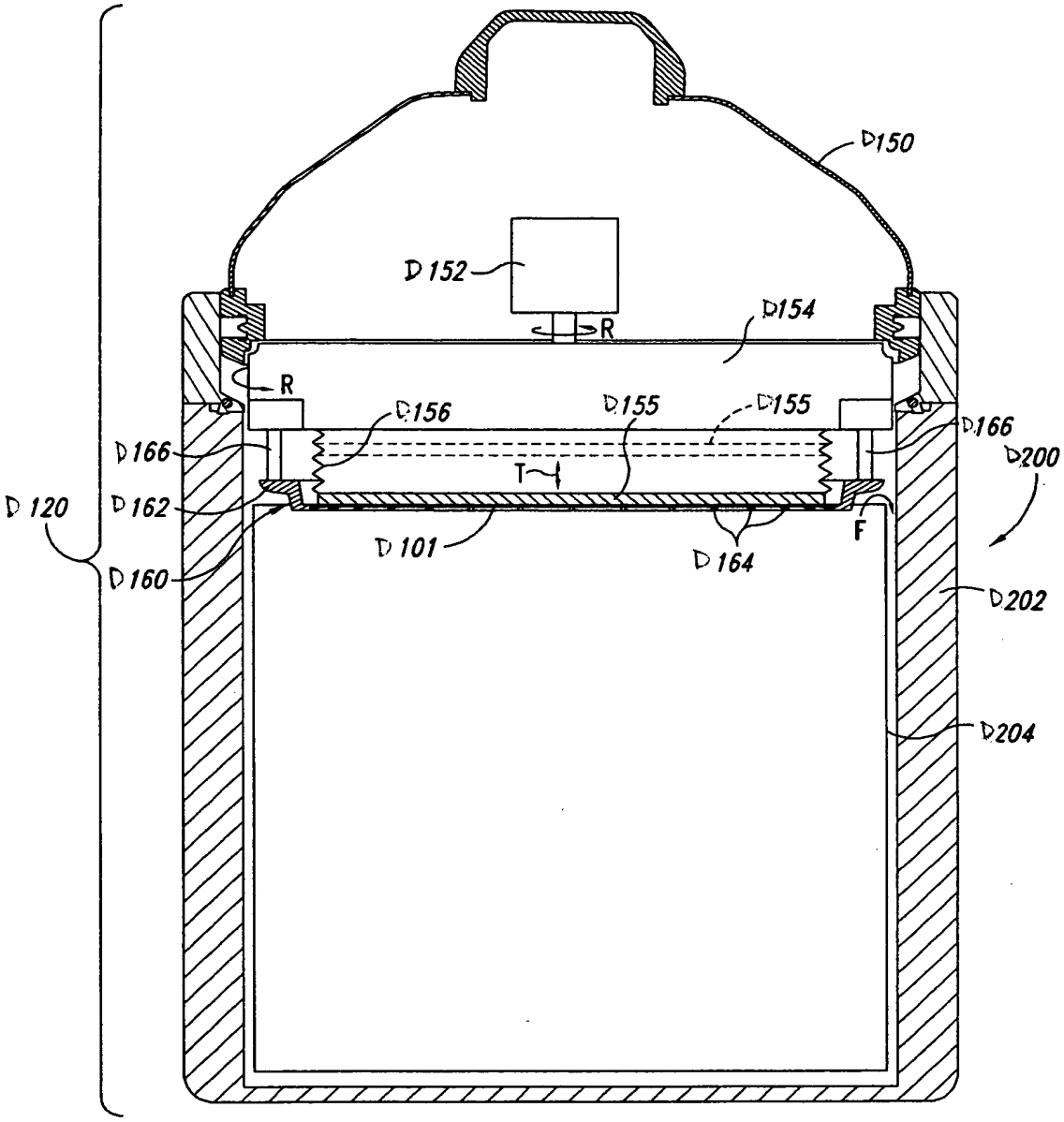

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Fig. D2

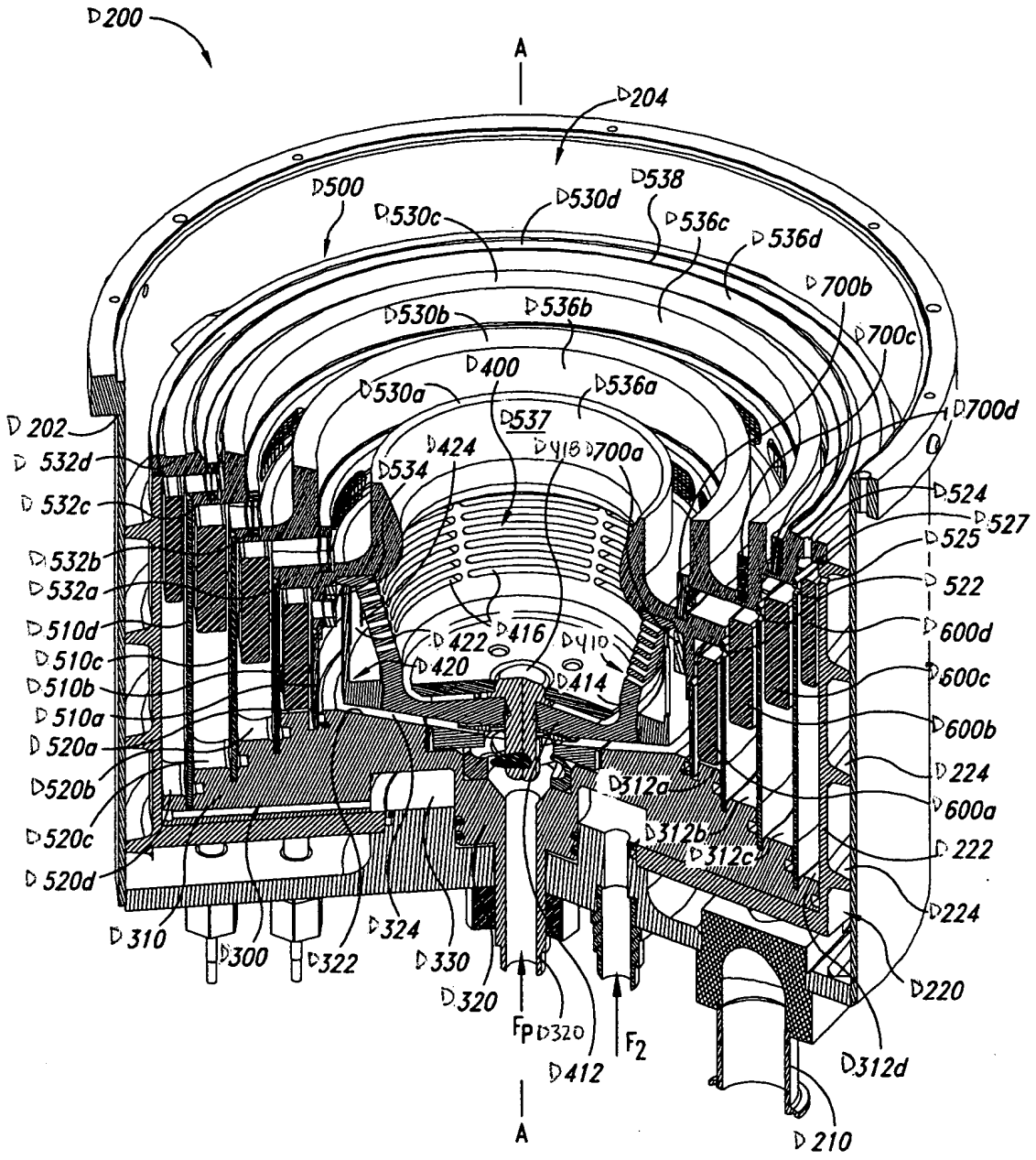
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Fig. 3

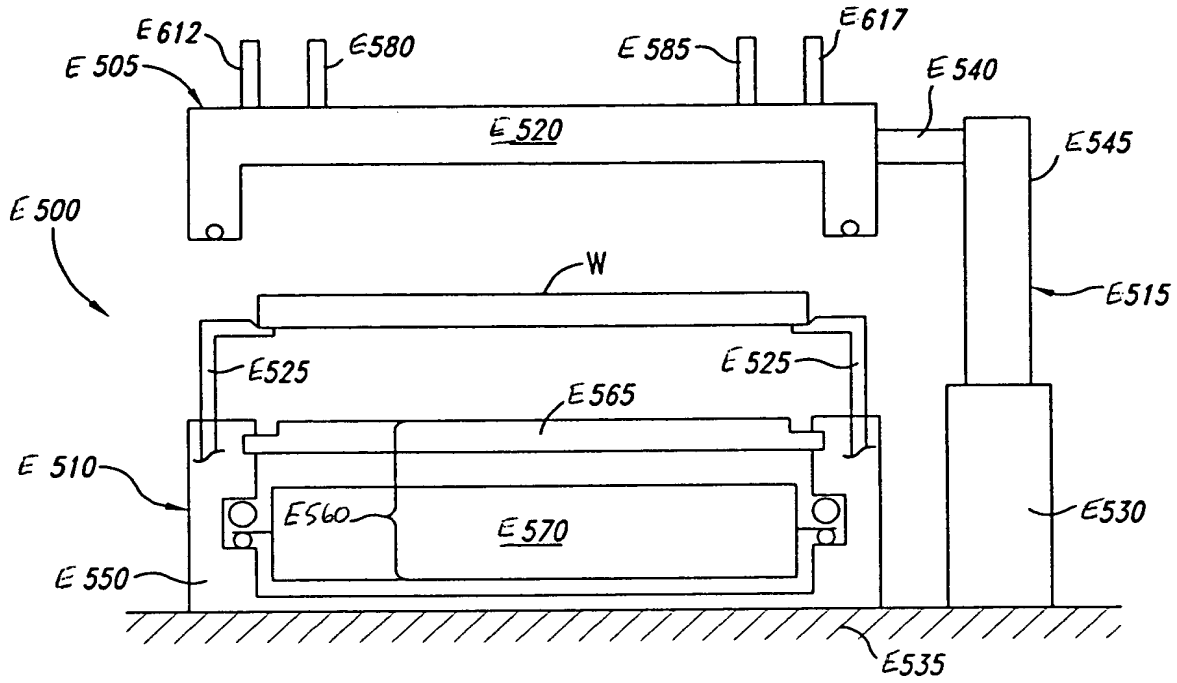

Fig. E1A

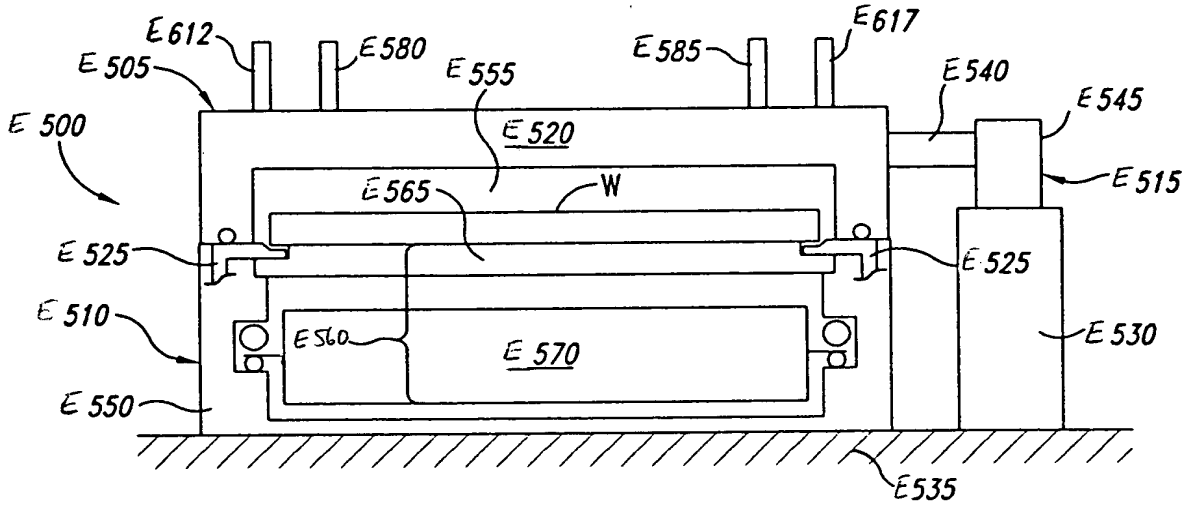

Fig. E1B

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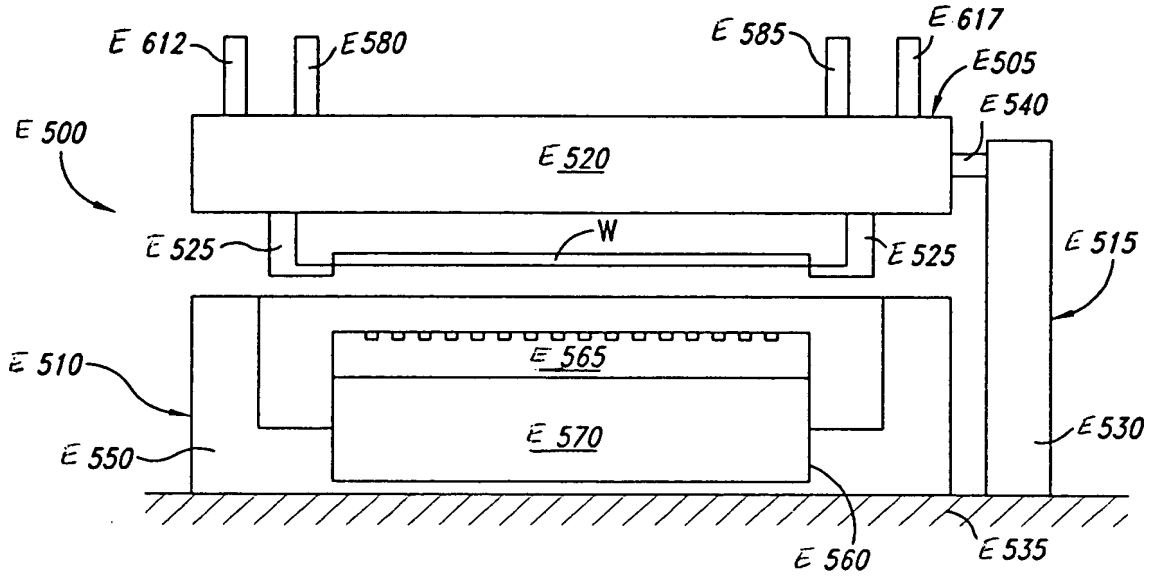

Fig. E1C

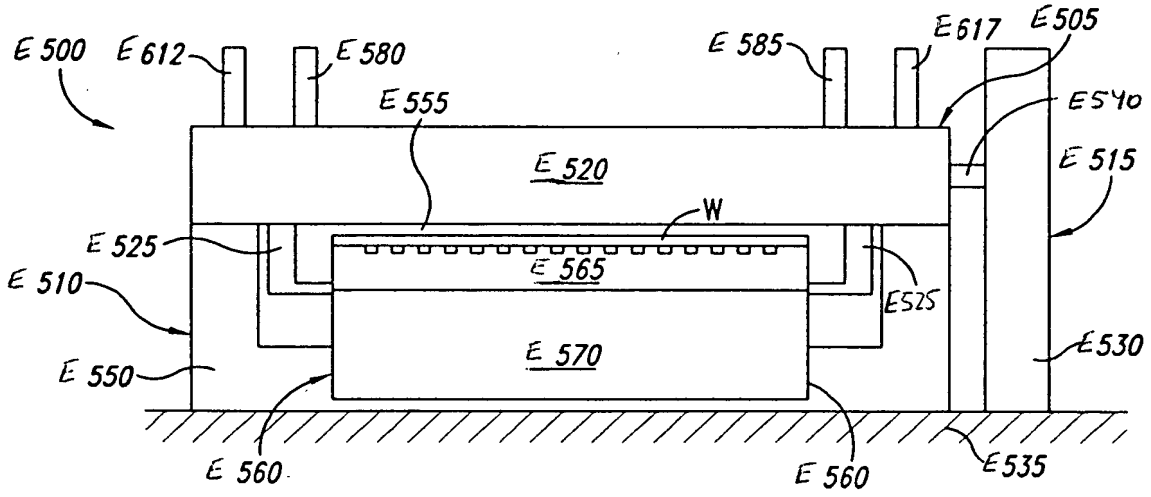

Fig. E1D

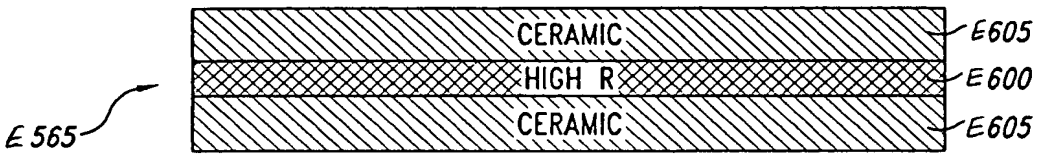

Fig. E2A

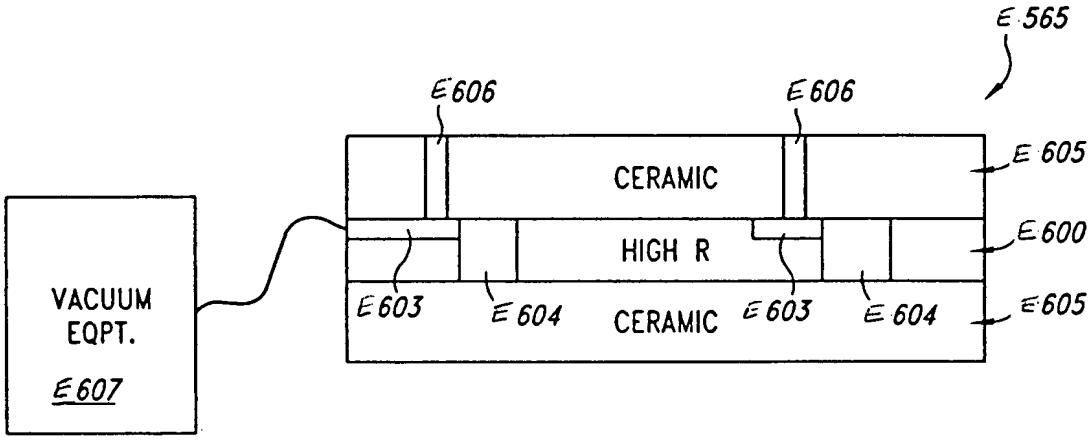

Fig. E2B

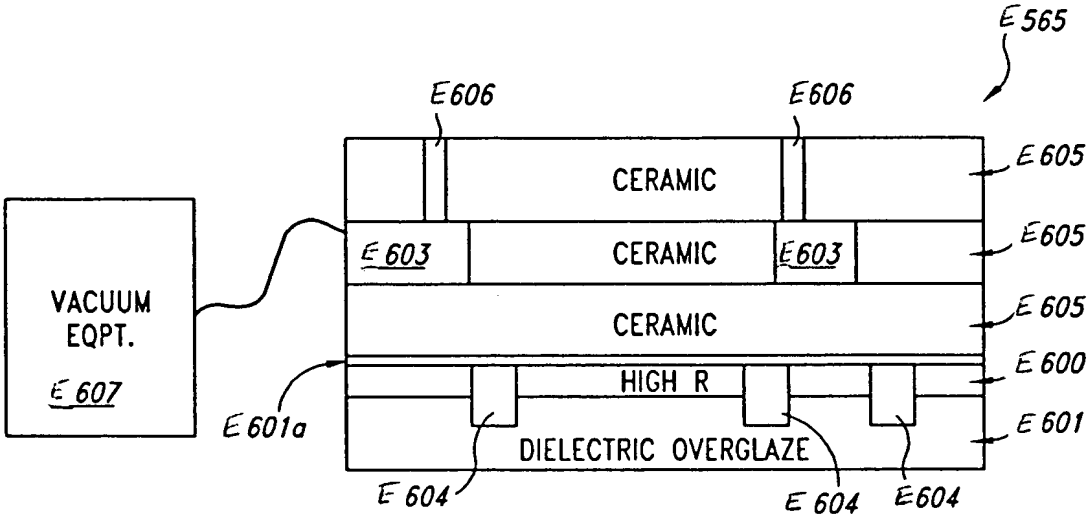

Fig. E2C

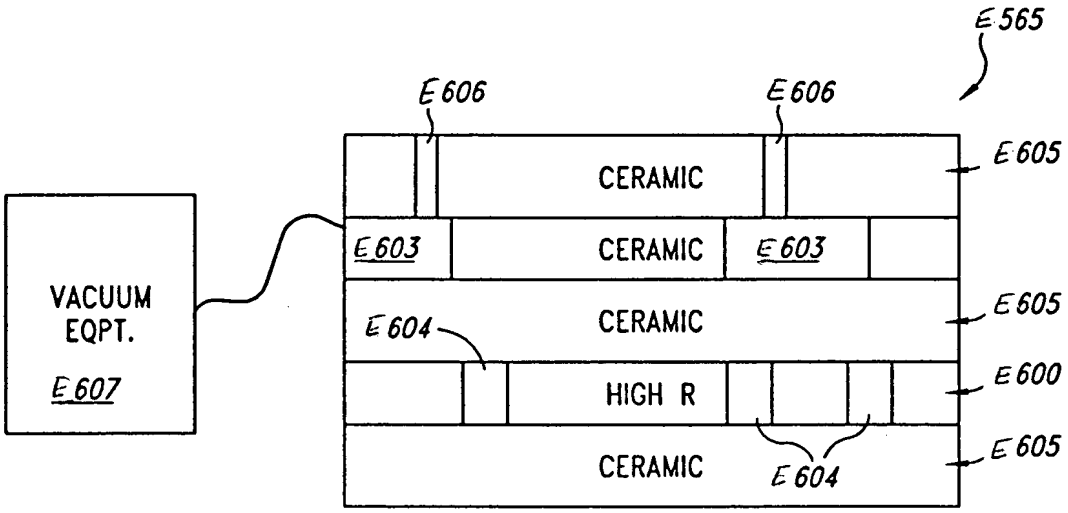

Fig. E2D

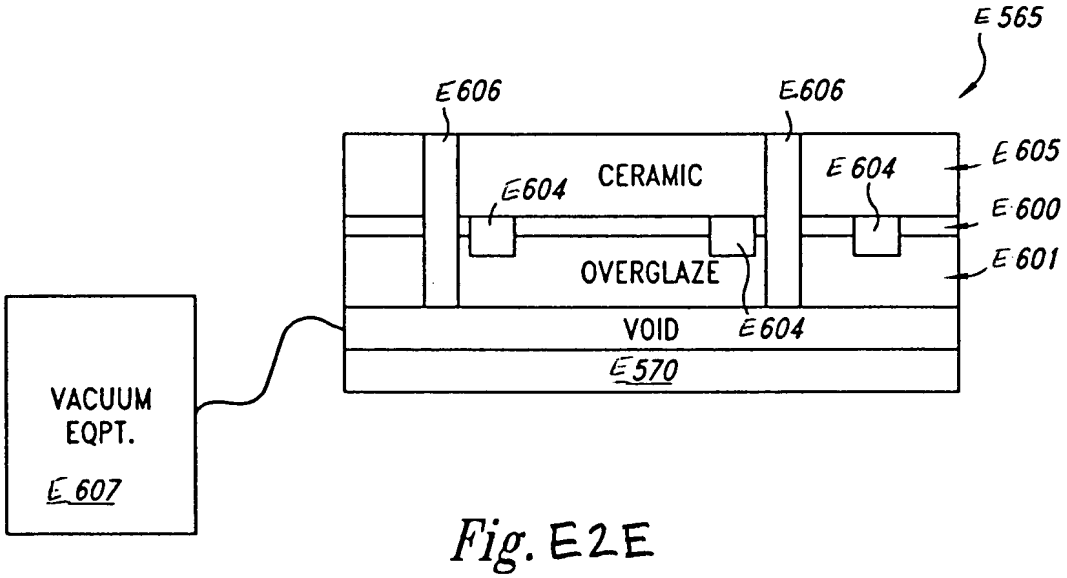

Fig. E2E

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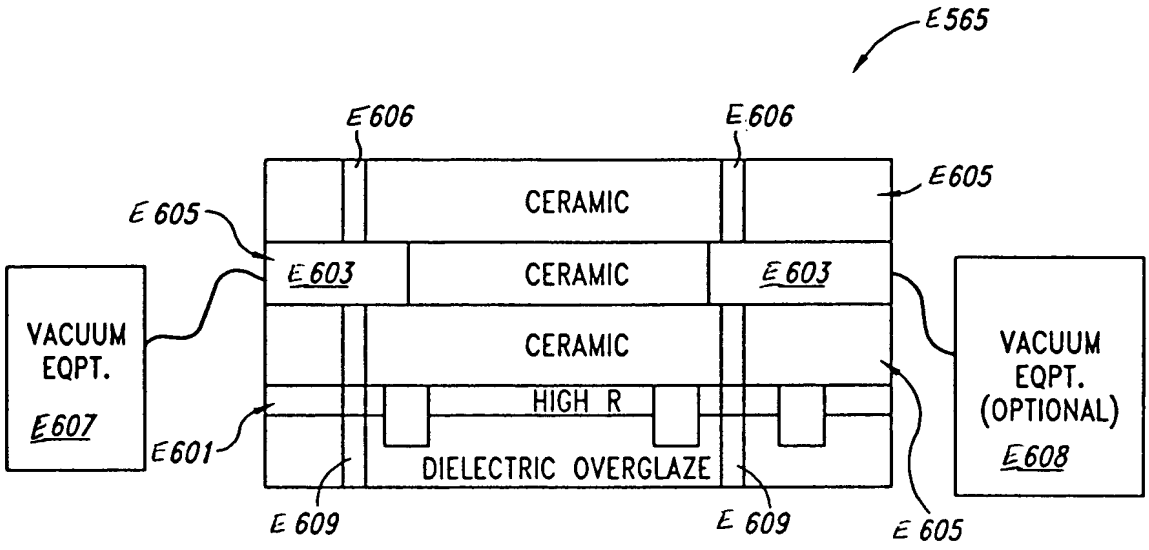

Fig. E2F

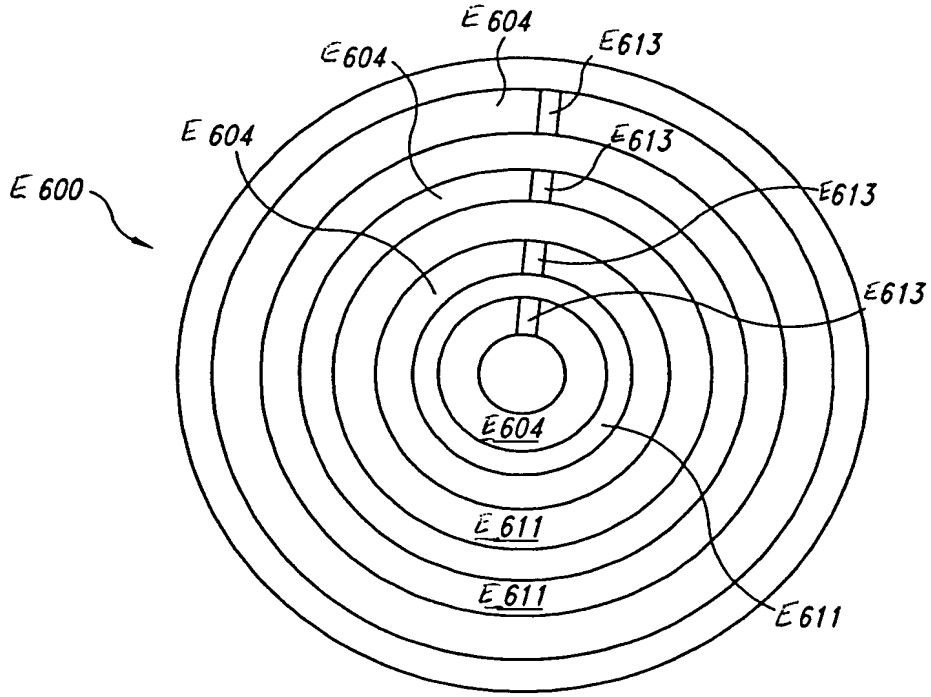

Fig. E2G

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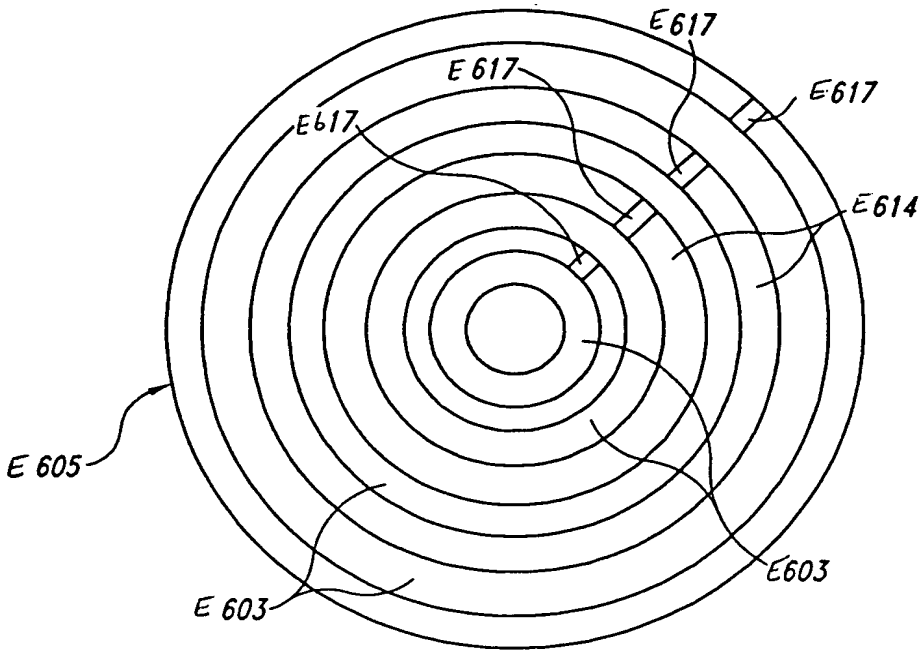

Fig. E2H

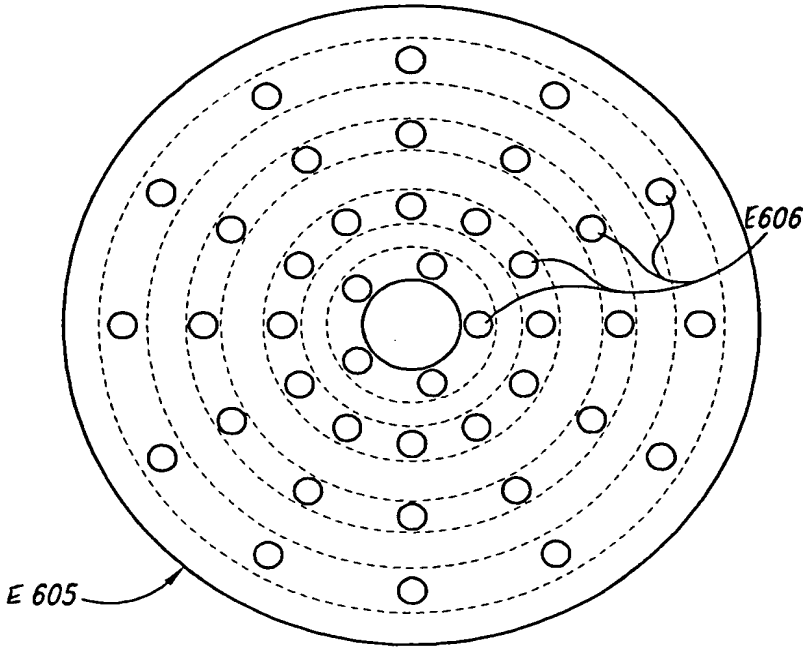

Fig. E2I

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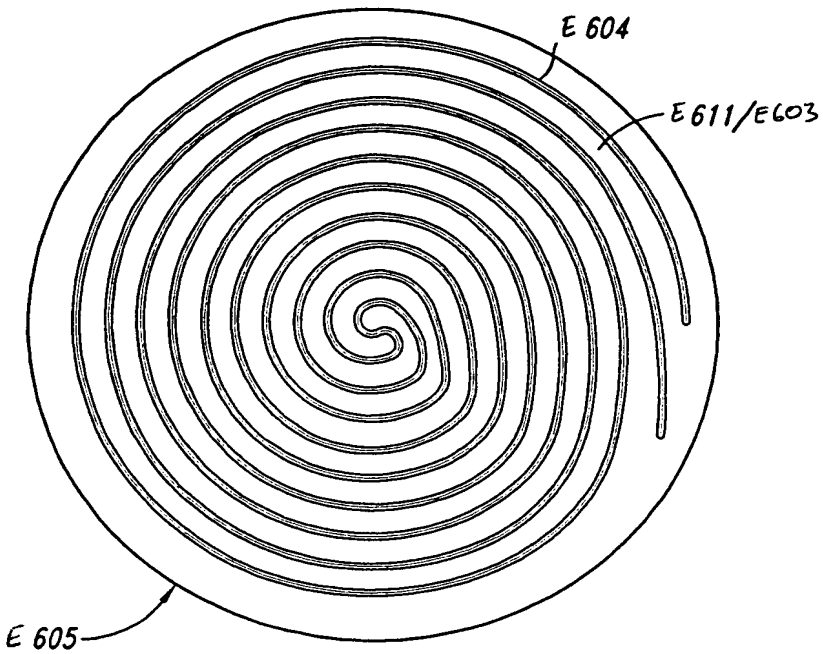

Fig. E2J

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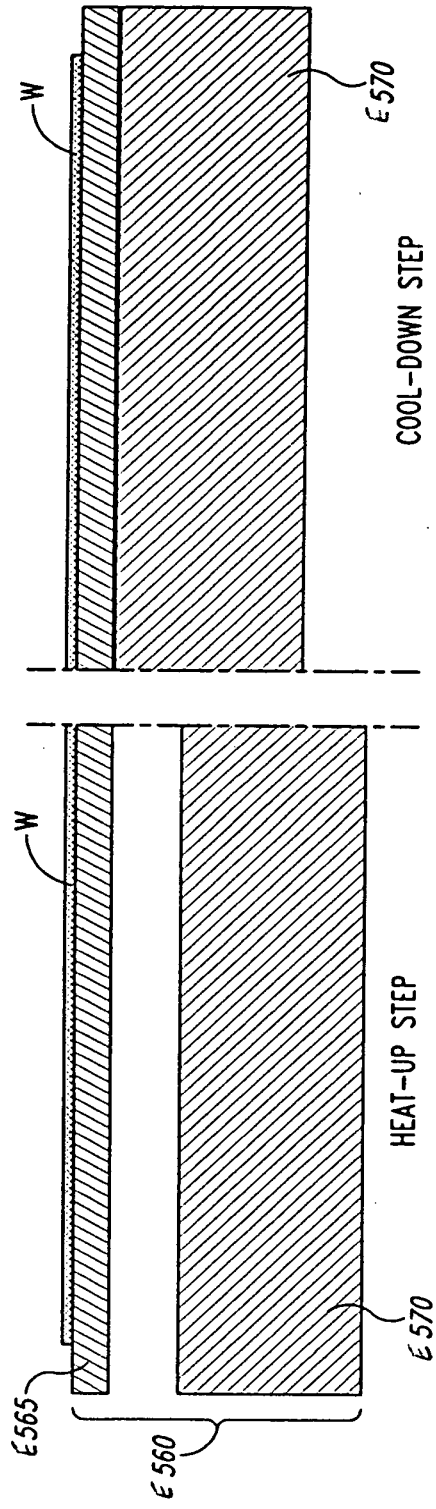

Fig. E3B

Fig. E3A

EP0907949A2 I 19990414

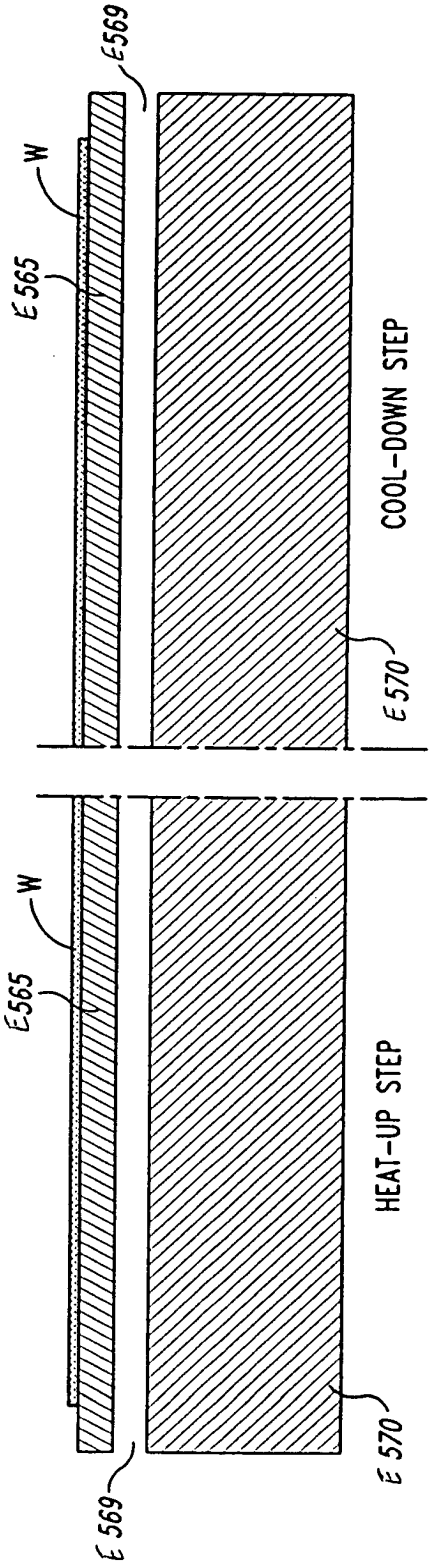

Fig. E4B

Fig. E4A

T06070 "Tech2060

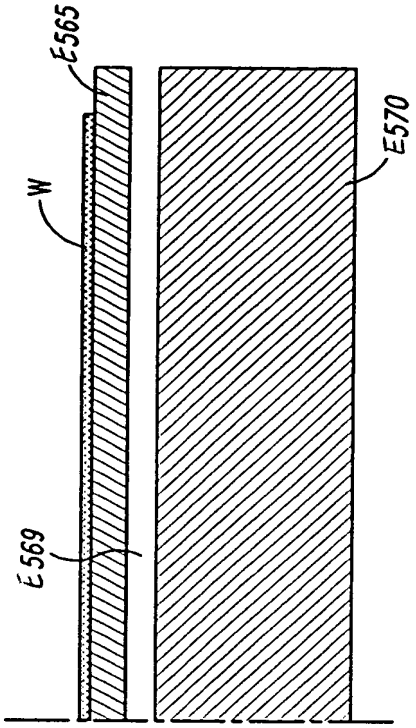

Fig. E5B

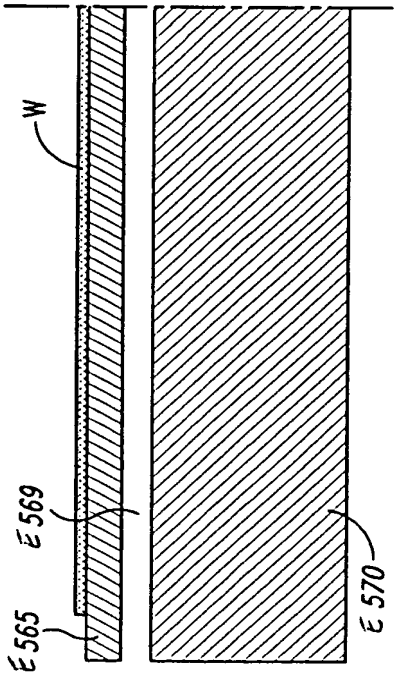

Fig. E5A

T06020 "T5th20650

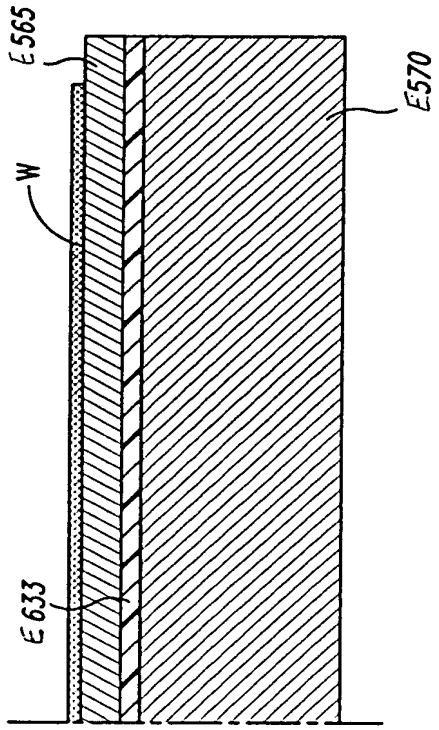

Fig. E6B

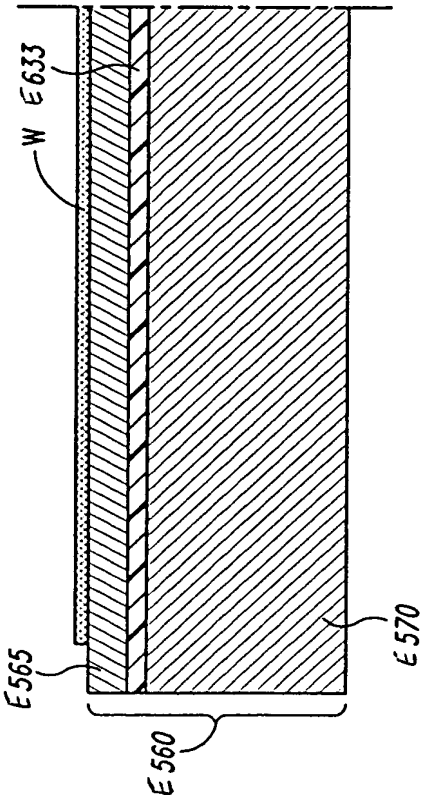

Fig. E6A

T06620 "T5420560

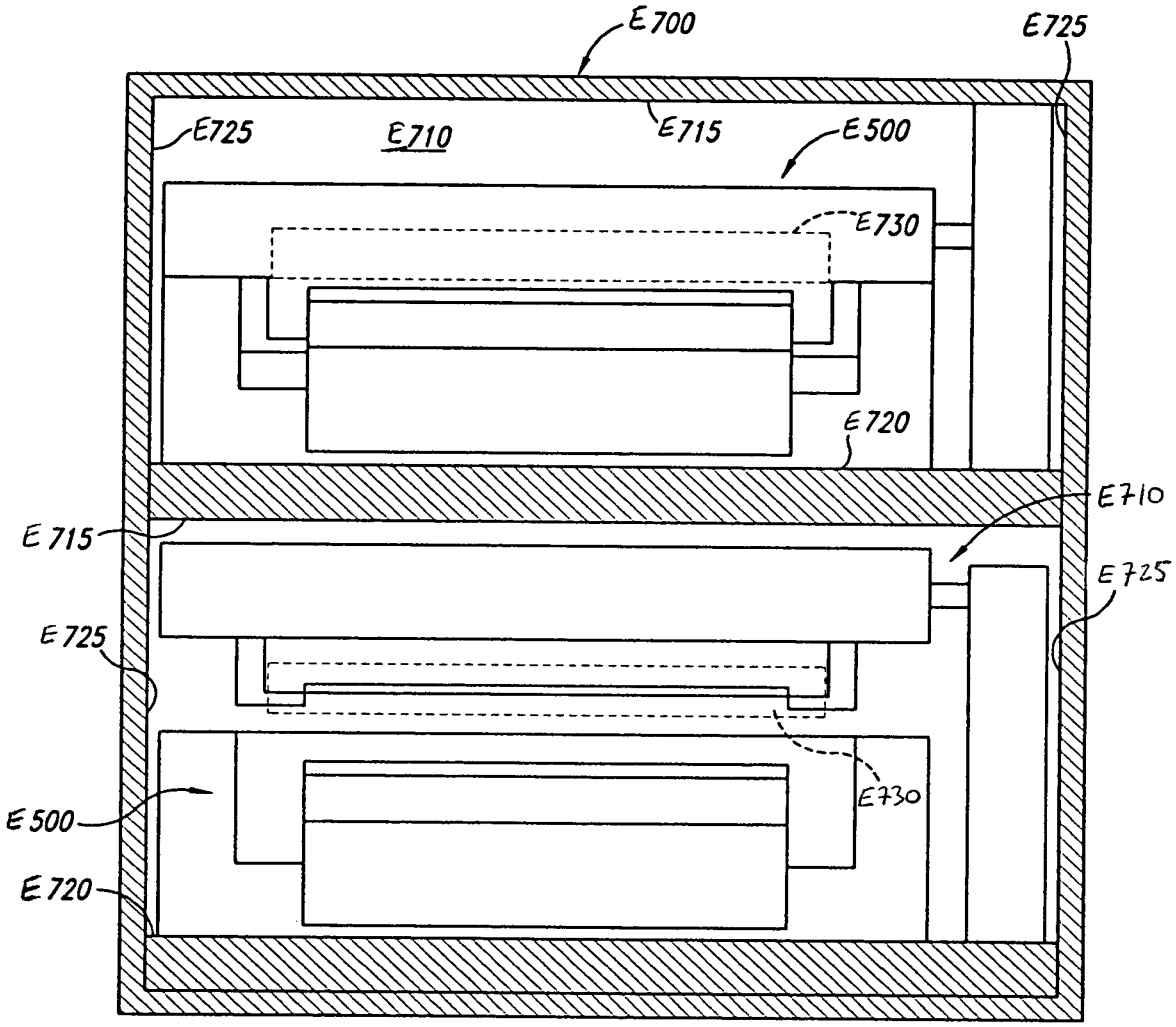
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Fig. E7

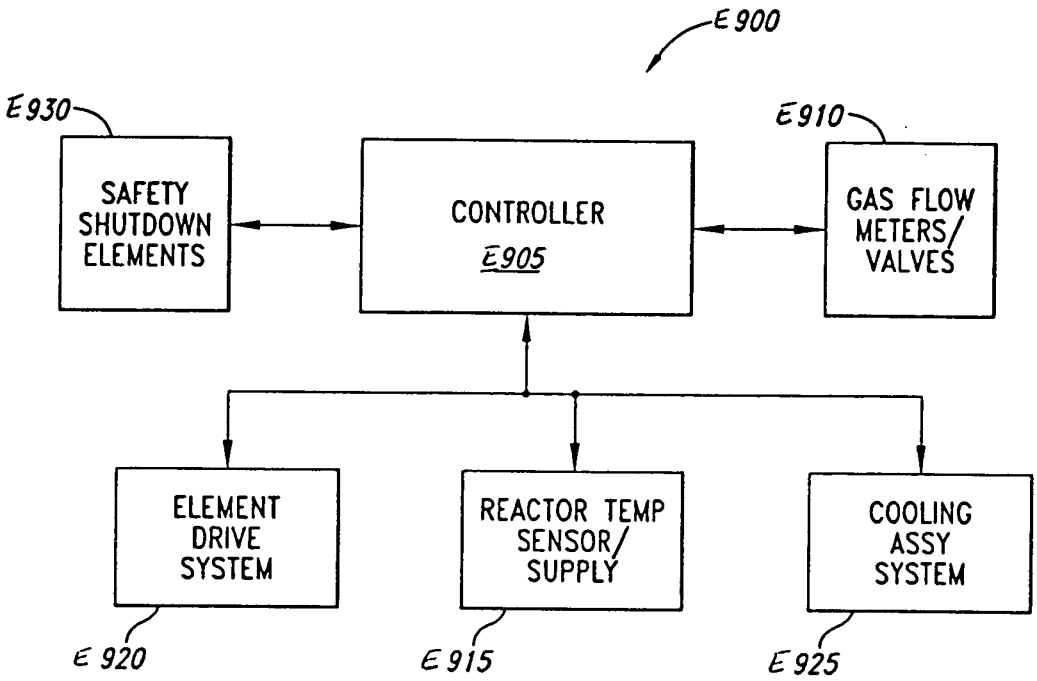

Fig. E8

WO 2004/065009 PCT/US2003/041341

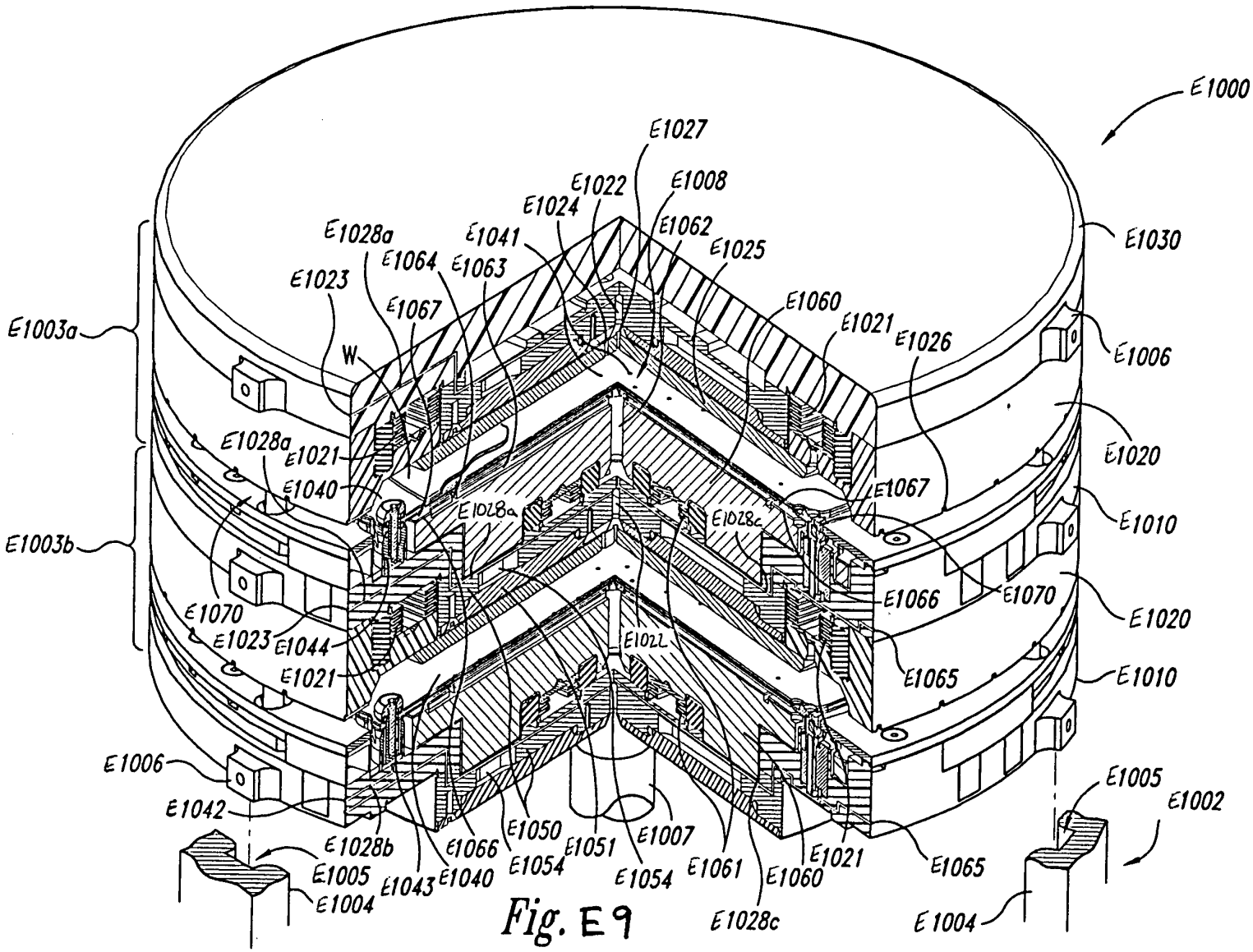
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Fig. E9